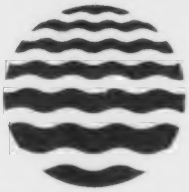
STOPPING WATER POLLUTION AT ITS SOURCE



MISA

Municipal/Industrial Strategy for Abatement

THE DEVELOPMENT DOCUMENT FOR THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Environment Ontario

Jim Bradley
Minister

89-05694/

ISBN 0-7729-5227-2

MUNICIPAL-INDUSTRIAL STRATEGY FOR ABATEMENT (MISA)

THE DEVELOPMENT DOCUMENT FOR THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Water Resources Branch: MISA

February 1989

Copyright: Queen's Printer for Ontario, 1989

USE OF THE MISA SECTOR SPECIFIC REGULATIONS WITH THE GENERAL REGULATION

Under the MISA program, the monitoring requirements for each sector are specified in two regulations - The General Effluent Monitoring Regulation (Ontario Regulation 695/88) and the relevant sector-specific regulation.

The General Effluent Monitoring Regulation provides the technical principles which are common to all sectors. It covers the "how to" items such as sampling, chemical analysis, toxicity testing, flow measurement and reporting.

The sector-specific regulation specifies the monitoring requirements of each direct discharger, such as the actual parameters to be monitored, the frequency of monitoring and the regulation in-force dates.

The General Effluent Monitoring Regulation, which must be used in conjunction with the sector specific regulation, is published under separate cover. The same document also includes a discussion of the MISA approach to effluent monitoring.

GENERAL INTRODUCTION

The purpose of this document is to provide background information on the development of the MISA Draft Effluent Monitoring Regulation for the Ontario Mineral Industry Sector: Group "A".

The pertinent information is set out in a number of sections. These sections provide:

- an overview of Group "A" plants including a description of the six subsectors that make up Group "A";
- an in-depth explanation of the technical rationale which led to the regulation in its present format;
- the draft effluent monitoring regulation;
- explanatory notes which provide an interpretation of the requirements of the regulation.

TABLE OF CONTENTS

PAGE

USE OF THE MISA SECTOR SPECIFIC REGULATIONS WITH THE GENERAL REGULATION i

GENERAL INTRODUCTION ii

PART I - RATIONALE FOR THE MONITORING REQUIREMENTS OF THE ONTARIO MINERAL INDUSTRY: GROUP "A" EFFLUENT MONITORING REGULATION

I	INTRODUCTION	I-1
II	DEFINITION OF THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"	I-1
III	BASIC PROCESSES USED BY GROUP "A" PLANTS	I-1
IV	PRINCIPAL RAW MATERIALS	I-11
V	PROCESS CHEMISTRY	I-14
VI	WASTEWATER	I-14
VII	IN-PLANT CONTROLS	I-17
VIII	WASTEWATER TREATMENT	I-17
IX	THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" IN ONTARIO	I-19
X	SECTOR OVERVIEW	I-19

PART II - TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

I	INTRODUCTION	II-1
II	DEFINITION OF THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" - STANDARD INDUSTRIAL CLASSIFICATION (SIC) SYSTEM	II-1
III	THE NEED FOR REGULATION	II-1
IV	THE U.S. EPA EXPERIENCE	II-2
V	THE MINISTRY/ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" DIALOGUE	II-3
VI	APPROACHES TO MONITORING	II-3
VII	THE EFFLUENT-SPECIFIC MONITORING APPROACH	II-4
VIII	PARAMETERS FOR MONITORING	II-5
IX	DATABASES USED FOR PARAMETER SELECTION	II-5
X	CLASSIFICATION OF EFFLUENTS	II-6
XI	FLOW MEASUREMENT	II-7
XII	PARAMETER/FREQUENCY ASSIGNMENT - GENERAL COMMENTS	II-8
XIII	PARAMETER/FREQUENCY ASSIGNMENT - SPECIFIC COMMENTS	II-12
XIV	VARIABILITY OF GROUP "A" EFFLUENT FLOWS AND CHEMISTRY	II-13
XV	SUMMARY: TYPE OF SAMPLES PERMITTED	II-15
XVI	ROUTINE MONITORING AND CHARACTERIZATION	II-15
XVII	OPEN CHARACTERIZATION	II-17
XVIII	TOXICITY TESTING	II-17
XVIX	QUALITY ASSURANCE/QUALITY CONTROL	II-19
XX	ECONOMIC IMPLICATIONS OF THE REGULATION	II-19
XXI	REFERENCES	II-20

PART IV - EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGUALTION FOR THE ONTARIO MINERAL INDUSTRY: GROUP "A"

Introduction IV-1

Section 1: Definitions IV-1

Section 2: Purpose IV-2

Section 3: Application IV-3

Section 4: Sampling Points IV-3

ROUTINE MONITORING

Section 5: Thrice Weekly Monitoring IV-4

Section 6: Monthly Monitoring IV-4

CHARACTERIZATION

Section 7: Quarterly Monitoring IV-4

Section 8: Storm Water Monitoring IV-5

Section 9: Quality Control Monitoring IV-5

Section 10: Toxicity Testing IV-6

Section 11: Flow Measurement IV-6

Section 12: Types of Samples Permitted IV-6

Section 13: Reporting IV-7

Section 14: Timing IV-8

PART V - A SUMMARY OF SUBSECTOR MONITORING REQUIREMENTS

A Summary of Subsector Monitoring Requirements V-1

Subsector Summary for Process Effluents V-2

Subsector Summary for Minewater Effluents V-12

Subsector Summary for Smelter/Refinery Effluents V-21

Subsector Summary for Storm Water Effluents V-31

PART III - REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Section 1 - Definitions III-1

Section 2 - Purpose III-3

Section 3 - Application III-3

Section 4 - Sampling Points III-4

ROUTINE MONITORING

Section 5 - Thrice Weekly Monitoring III-4

Section 6 - Monthly Monitoring III-4

CHARACTERIATION

Section 7 - Quarterly Monitoring III-5

Section 8 - Storm Water Monitoring III-5

Section 9 - Quality Control Monitoring III-5

Section 10 - Toxicity Testing III-6

Section 11 - Flow Measurement III-6

Section 12 - Types of Samples Permitted III-6

Section 13 - Reporting III-7

Section 14 - Timing III-8

Schedule A - Copper, Lead, Zinc, Nickel Subsector III-9

Schedule A - Gold Subsector III-19

Schedule A - Iron Subsector III-29

Schedule A - Salt Subsector III-39

Schedule A - Silver Subsector III-49

Schedule A - Uranium Subsector III-59

Schedule B III-69

Schedule C - Sampling Principles III-78

Schedule D - Analytical Principles & Analytical Method Detection Limits III-80

PART VI - A SUMMARY OF THE RESULTS OF THE ONTARIO MINERAL INDUSTRY: GROUP "A" MISA PRE-REGULATION MONITORING PROGRAM

A Summary of the Results of the Ontario Mineral Industry: Group "A" MISA Pre-regulation Monitoring Program VI-1

Base Metal Sulphides VI-1

Iron Ore Operations VI-1

Uranium VI-2

Gold VI-2

Sampling Locations: Effluent Types VI-2

SUMMARY
Pre-characterization Data - Conventional Parameters VI-2

Pre-characterization Data - Organics VI-4

PART VII - MISA ADVISORY COMMITTEE REPORT REGARDING THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Letter to the Minister VII-1

1. Introduction VII-3

2. Advice to the Minister VII-3

3. Regulation-Specific Recommendations VII-3

PART VIII - MINISTRY OF THE ENVIRONMENT'S RESPONSE TO THE MISA ADVISORY COMMITTEE REPORT

Letter to the MISA Advisory Committee VIII-1

MAC Recommendation VIII-2

MOE Response VIII-2

TABLES

Table 1 Probability of Detecting at Least One Sample Above the Detection Limit II-16

Table 2 Sampling Locations: Effluent Types VI-3

PART I

OVERVIEW OF THE ONTARIO MINERAL INDUSTRY SECTOR:

GROUP "A"

PART I - OVERVIEW OF THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

I INTRODUCTION

The first part of this section serves as an introduction to the Ontario Mineral Industry Sector: Group "A". It defines Group "A" and serves to describe the mining processes that apply to Group "A", the general process chemistry including wastewater generation and treatment.

The section concludes with a specific outline of each of the six subsectors that make up Group "A" with emphasis on the differences of each subsector.

I I DEFINITION OF THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Two groups ("A" and "B") operate under the Ontario Mineral Industry Sector. A separate regulation is being prepared for each group.

All plants in the Ontario Mineral Industry Sector fall into Group "A" or into Group "B". Metal mines and salt mines are found in Group "A". Industrial mineral mines are found in Group "B".

Because of the diversity of the Ontario mining industry and the large number of plants involved, Group "A" has been subdivided into six very distinct subsectors as follows:

(1) Copper, Lead, Zinc, Nickel
(2) Gold
(3) Iron
(4) Salt (sodium chloride)
(5) Silver
(6) Uranium

The unique nature of each subsector is derived from a combination of differences that involve mineralogy and geology, methods of mining and methods of processing.

All plants and effluents covered under the Effluent Monitoring Regulation are listed in Schedule B.

I I I BASIC PROCESSES USED BY GROUP "A" PLANTS

Mining, in Ontario, takes place in every part of the Province. Although it is not a major mining area, southern Ontario does possess important deposits of salt, oil, gas and gypsum. Most of these deposits are being actively worked. The climate of southern Ontario is mild and the winters are short. The total annual precipitation consists of 69 centimetres of rain and 165 centimetres of snow.

In Ontario, most of the important mines are located in the north in Precambrian rock that forms part of the internationally famous Canadian Shield. The climate in the shield region of Ontario is much more severe than that in the southern region. The annual precipitation in the shield region consists of approximately 79 centimetres of rain and 285 centimetres of snow. Although summer temperatures in excess of 30° C are not uncommon, winter temperatures below minus 40° C are frequent.

In mining, the term 'hard rock' is loosely used to distinguish igneous and metamorphic rocks from sedimentary rocks. The Canadian Shield is one of the largest and richest hard-rock mining areas in the world. Thousands of square miles of Shield area lie within the boundaries of Ontario.

Mining operations follow two basic patterns: open pit and conventional underground. Of the two, underground operations predominate. It is not unusual, however, for open pit mining to precede conventional underground mining at any particular deposit providing that the geology and ground conditions are suitable.

There are standard underground mining procedures but the varying shapes of orebodies and changeable geology result in no two mines ever being alike.

Mines range all the way from the early prospect which may have only a single level with limited lateral workings, to the deep and complex workings of mines that have been in production for many years. Many Ontario mines reach depths of over 1 kilometre and many Ontario mines have more than 100 kilometres of workings underground.

Opening and developing a mine is expensive. Consequently, any mine layout requires a great deal of planning. As it is desirable to obtain as much information as possible about the nature and attitude of the orebodies before shaft sinking commences, most mining companies like to carry out detailed drilling prior to launching any underground program.

ORE RESERVES DEFINED

Ore is generally defined as a valuable mineral or an aggregate of valuable minerals, more or less mixed with a gangue (waste) material which from the standpoint of a miner can be won at a profit or from the standpoint of the metallurgist can be treated at a profit. Thus, in the case of a mineral-bearing vein, if the average value of a sufficient tonnage is such that a profit is indicated, then the vein filling is called ore. Otherwise, the vein filling is just waste rock.

An orebody is generally a solid and fairly continuous mass of ore which may include low-grade and waste as well as pay ore but is individualized by form or character from adjoining country rock.

Positive ore is ore which is exposed and properly sampled on four sides, in blocks of a reasonable size, having in view the nature of the deposit as regards uniformity of value per tonne and of the third dimension, or thickness.

Proven ore is therefore ore involving practically no risk of failure of continuity.

Probable ore is ore that is reasonably assured but not absolutely certain.

Possible ore reflects the prospective value of a mine beyond or below the last visible ore based on the most accurate data from the mine being examined and from the characteristics of the mining district.

Unbroken ore in an ore body is called ore-in-place.

The term ore reserves, although commonly quoted in terms of 'proven', 'probable' and 'possible', essentially refers to ore-in-place that has been sufficiently developed by means of drifts, raises and crosscuts to show the necessary grade and tonnage. Broken ore reserves are made up of ore contained in stopes after breaking but will generally include ore contained in other underground workings or in the surface dump.

In a vein type deposit, the wallrock is that rock adjacent to the vein and is usually distinguished as the hanging wall on the upper side and the footwall on the under side. In a general sense the term country rock is comparable to the term wallrock but is generally extended to cover the rock surrounding any orebody (vein or lode type). In a wider sense, it may be applied to the rocks invaded by and surrounding an igneous intrusion.

MINING

A) CONVENTIONAL UNDERGROUND

When a mine is put into operation, a shaft is sunk near the orebody. Horizontal passages are cut from the shaft at various depths to reach the ore. The ore is then removed (generally), hoisted to the surface, crushed, concentrated and refined. Waste rock or classified mill tailings may be returned to the mine as fill for the mined-out areas or may be directed to a disposal basin (tailings area).

THE SHAFT

The shaft provides a means of entry or exit for people and materials, and for the removal of ore or waste from underground to surface. It may be vertical or inclined.

> NOTE: A passageway or opening driven horizontally into the side of a hill generally for the purpose of exploring or otherwise opening a mineral deposit is called an adit.

In Ontario, mines have ranged to a depth of more than 2500 metres. Shafts may be rectangular or circular.

Shafts usually contain from one to eight compartments. Shafts sunk from underground levels are called winzes. Winzes are established to permit mining at depth.

Shaft conveyances include buckets, skips, cages or skipcage combinations. The first two are for hoisting rock or ore and they vary in load capacity (generally from one to eighteen tonnes). They travel at approximately 3,000 feet per minute. Cages are used for men and materials and can transport as many as 85 people per load at slower speeds. Safety devices exist to prevent shaft conveyances from falling, should cables fail.

LEVELS

Levels - horizontal passages in a mine - are generally driven from the shaft at vertical intervals of 30 - 60 metres. That part of the level driven from the shaft to the orebody is known as the crosscut, and that part which continues along the orebody is known as a drift. Crosscuts and drifts vary in size depending on the size of the haulage equipment in use.

A raise is an opening made in the back (roof) of a level to reach the level above.

STOPES

A stope is an excavation where the ore is drilled, blasted and removed by gravity through chutes to ore cars on the haulage level below. Stopes require openings (manways) to provide access for people and materials. Normally, raises connect a stope to the level above and are used for ventilation, for convenience in getting people and materials into the stope, and for admitting backfill.

STOPING METHODS

The stoping method used normally depends on the stability of the walls and ore as ore removal progresses. The three common stoping methods used in Ontario are:

1. The Shrinkage Stope: is used chiefly in narrow regular orebodies where the walls and ore require little support. After each blast, sufficient ore is pulled from the chutes to make room for the miners to drill and blast the next section. As the stope progresses upwards the manways are raised slightly above the level of the broken ore. When the stope reaches the level above, it will be full of broken ore (classed as broken ore reserves). On removal of the ore, the stope may be filled with waste material.

2. The Cut-and-Fill Stope: is used in wider irregular orebodies where the walls require support to minimize dilution (waste from the walls falling into the broken ore). A horizontal section of ore is drilled, blasted and removed. Chutes and manways then are raised to about two metres from the stope roof. Waste material (or mill tailings) is dumped into the stope through the waste-pass raise until it is level with the chutes and manways. Flooring (wood or concrete) is placed over the fill before the next ore cut is drilled and blasted. Scrapers or diesel endloaders are used to remove ore to the chutes and to level waste or backfill in the stope.

3. The Square-Set Stope: is used in an orebody where the walls and ore require support during ore removal. After each blast, square-set timbers are erected and made solid by blocking to the walls and back. The chutes and manways are raised and backfill is placed in the stope as in the cut-and-fill method. Flooring, called a mucking floor, is laid on the backfill at chute elevation. A floor above, supported on the square-sets where drilling and blasting is carried out, is called the mining floor. Square-set timbering protects the miners from loose rock which might fall from the walls and back of the stope.

SAFETY AND VENTILATION

The Occupational Health and Safety Act: Ontario Regulation for Mines and Mining Plants regulates the operation of mines and requires that a second escapeway be provided for the safety of miners before stoping begins.

Large volumes of fresh air are required to ventilate a mine. This air is delivered from the surface by fans. Some air is drawn off at each level and directed to the working places. Stale air is returned to the surface. Ventilation doors on each level near the shaft station prevent the air from returning to the surface before it has reached the work areas. Special provisions are made for ventilation when diesel equipment is used underground.

B) OPEN PIT OPERATIONS

Whether an orebody will be mined by open pit or underground methods will be determined by the economics of the operation. In all instances, the total capital and operation costs must be considered. A correct decision is extremely important inasmuch as the equipment for open pit and underground use is not interchangeable. Further, investment in equipment for either mining method and pre-production stripping expense for open-pit mining must be made long before mining commences and before returns are received or the method is proven successful. In general, open pit mining is more economical than underground mining especially when the orebody is large and the depth of overburden is not excessive.

Some predominant advantages inherent in the open pit method are as follows:

a) The open pit method is quite flexible in that it allows for large increases or decreases in production on short notice without rapid deterioration of the workings.

b) The method is safe. Loose material can be seen and removed or avoided. Crews can be readily observed at work by supervisors. The relatively small number of men employed contributes to safety.

c) Selective mining is possible without difficulty. Grade control can be easily accomplished by leaving lean sections temporarily unmined or by mining for waste.

d) The total cost of open pit mining, per tonne recovered, is usually only a fraction of the cost of underground mining. Further, the cost spread between the two methods is growing wider as larger-scale methods are applied to open pits.

STRIPPING

Material overlying an orebody may consist of earth, sand, gravel, silt, rock or even water. Removal of this material generally falls under the heading of stripping. Normally, stripping of rock will be considered a "mining" operation. Generally, stripping will be accomplished with heavy earth-moving equipment such as the caterpillar-type tractor. Suction and cutter dredges are sometimes used. Removal of overburden generally takes place concurrently with construction of the surface plant, after a decision to mine by open pit has been reached.

BREAKING

Drilling

Drilling is the basic part of the breaking operation in open pit mining; considerable effort has therefore been expended to develop equipment for drilling holes at the lowest possible cost. There are several types of drills which can be used. These include churn drills, percussion drills, rotary drills and jet-piercing drills. All are designed with one objective in mind: to produce a hole of required diameter, depth and direction in rock for later insertion of explosives.

Blasting

Basically, explosives are comprised of chemicals which, when combined, contain all the requirements for complete combustion without external oxygen supply. Early explosives consisted chiefly of nitroglycerine, carbonaceous material and a oxidizing agent. These mixtures were packaged into cartridges for convenience in handling and loading into holes. Many explosives are still manufactured and packaged to the basic formulas.

In recent years it has been discovered that fertilizer-grade ammonium nitrate mixed with about 6 percent fuel oil (the mixture is called ANFO) could be detonated by a high explosive primer. This new application has spread to the point where virtually all mining companies use this mixture for some or all of the primary blasting. Secondary blasting is usually done at the end of a shift by means of cartridge explosives and electric caps. However, as pit equipment becomes larger and as the scale of operation increases, secondary blasting becomes a relatively smaller part of the mining operation.

LOADING

After the ore has been broken, it is transferred to the mill for treatment. Although a variety of loading equipment is used in open pit mines depending on the scale of operations, the power shovel seems to be preferred.

MILLING

Each mining operation attempts to remove locally as much of the waste rock as possible from its ore and ship the enriched product to a strategically located smelter or refinery. This process of removing the waste rock and separating the valuable materials is termed concentrating. The mill is a concentrator and the product is a concentrate.

Ores generally consist of a complex mixture of valuable and non-valuable particles. The valueless particles are referred to as "gangue".

In a complex ore, it is possible to have microscopic particles of one mineral species existing as cores within small blebs of other species (for example, sphalerite within galena). The purpose of crushing and grinding the ore in the mill, therefore, is to cleanly liberate all the desirable constituents of the ore so that each may be recovered as a separate concentrate.

It is unusual in most ores to affect good liberation of values at sizes coarser than 200 mesh. However, if the crushing and grinding part of the process is not controlled very carefully, a fraction of submicron sizes are produced and these may interfere with subsequent operations. Thus, in milling, the objective is to reduce the ore in size to a degree of fineness which gives an economic liberation of the valuable mineral or minerals but which avoids as much as possible the production of sliming fractions.

CRUSHING

After the ore is broken underground in the mine, it is generally sent to the surface for storage in a coarse ore bin. When required, the coarse ore bin feeds a primary crusher. This is usually a jaw crusher which consists essentially of a fixed vertical jaw or plate, and a movable jaw at a slight vertical angle; the movable jaw being pushed backward and forwards by a system of toggles. The rock falls into the opening between the jaws at the top of the crusher and is crushed by the rapid, but short,

forward motion of the movable jaw. The plates converge towards the bottom and thus the rock may be pinched and shattered several times before it falls free of the bottom opening.

NOTE: In some cases, the primary crusher may be installed underground at the bottom of the ore pass system. This facilitates skip loading since unwieldly pieces of ore are eliminated.

Some large tonnage concentrators use a gyratory crusher for the primary breaker. It consists of a heavy gyratory crushing head mounted on a vertical shaft. The head works inside a crushing bowl that is fixed to the main frame. Rock introduced into the bowl is caught and nipped by the gyrating head. It then falls through an opening of predetermined size. Gyratory crushers, usually installed on the surface at large mining properties, can handle three or four hundred tonnes per hour.

The need for a secondary crusher frequently arises when the product from the primary crusher is too large for efficient grinding.

Crushing is done dry and usually takes place in a building separate from the mill or concentrator. Capacity is usually such that the entire daily tonnage requirement is crushed in one or two shifts. This permits balancing of power loads and labour requirements and provides opportunity for repairs.

Size control of the crusher house product is generally achieved with the use of a vibrating screen. The oversize from the screen is returned for further crushing. The remainder of the material is directed to fine ore storage bins (which feed the grinding circuit).

Crusher houses are generally equipped with dust control and ventilation systems which are designed to eliminate any build-up of dust particles in the air.

It is necessary to provide mill-feed storage on the surface at a mining operation since a mill (or concentrator) usually operates 24 hours per day, seven days per week; whereas a mine and crusher plant may only work five or six days per week. At least thirty hours' requirements of crushed ore are generally available in the fine ore storage bins.

GRINDING

Ore from the fine ore bins, along with water, is directed to one or more grinding units in the mill. Each unit generally consists of a ball or rod mill that operates with or without a classifier.

A ball mill consists of a horizontal cylindrical revolving shell that is supported on hollow trunnion bearings. The ore enters through one trunnion opening and is discharged through the other. The mill is kept about half filled with steel balls which, as the mill revolves, cascade and roll over each other. It is this action that crushes the ore. As the balls wear smaller they form a charge of graduated size and therefore, only balls of the largest size are added to maintain the ball charge. The size of the new balls in any particular mill varies. The size is dependent on the size of the mill feed and on the toughness of the ore itself.

A rod mill differs from a ball mill in that steel rods instead of steel balls are used as the grinding media. The rods are approximately the length of the interior of the mill itself.

Autogenous grinding units are becoming quite common. These units force the ore to crush and grind itself. Rods and balls are eliminated. Autogenous mills can be either wet or dry.

CLASSIFICATION

The usual function of a classifier in a mill circuit is to perform a physical separation that results in oversize particles being returned to mills for further grinding.

In operation, the pulp discharged from a grinding mill flows down a launder to a classifier. The classifier generally takes the form of a long inclined tank that has been equipped with a rake-type mechanism that is able to move sandy material up the incline. The pulp from a mill enters the bottom end of the inclined tank where the heavier, coarser particles settle and are caught and moved up the incline by the rake mechanism to the top end of the tank. From here, the coarse particles flow by gravity into the feed end of a grinding mill. The fine particles that do not settle at the bottom end of the tank are carried, as finished particles, by a current of controlled velocity over an adjustable weir and are directed to the next stage of the process (usually flotation).

Many kinds of classifiers, especially those which operate on a centrifugal principle, are coming into wide use in newer plants.

Grinding in closed circuit is a term used to describe a mill and a classifier that work together as a unit. The material so produced will have a certain maximum size. The finest size produced is controlled to some extent.

A rod mill may be used to prepare feed for a ball mill. In this case, it may function without a classifier and this is termed open circuit operation.

After the material has been ground to the required size, it may be subjected to one or more of a large number of processes that are available. Such processes include flotation, cyanidation, dissolution in acid and ion exchange.

FLOTATION

Flotation, or more specifically froth flotation, is a physico-chemical method of concentrating finely ground sulphide ores (it may, in some instances, be applied to non-sulphide materials). The process involves chemical treatment of an ore pulp to create conditions favourable for the attachment of certain mineral particles to air bubbles. The air bubbles carry the selected minerals to the surface of the pulp and form a stabilized froth which is skimmed off while the other minerals remain submerged in the pulp.

In general, sulphide mineral particles coarser than 48 mesh (about 295 microns or 0.295 millimetres in diameter) cannot be effectively recovered; consequently, an ore that is to be floated must first be ground fine enough so that the desired mineral particles are all, or substantially all, smaller than this limiting size.

The creation of a rising current of air bubbles is accomplished by a flotation machine which produces bubbles by mechanical agitation of the ore pulp, the direct introduction of air under pressure, or both. These operations may be considered as the mechanical adjuncts of the flotation process.

To obtain the adherence of the desired mineral particles to the air bubbles and hence the formation of a mineral-laden froth on the surface of the ore pulp, a hydrophobic surface film must be formed on the particles to be floated and a hydrophilic or wettable film on all others. This is done by adding various chemicals. The selection of these chemicals for each particular ore constitutes the principal problem of the ore dressing metallurgist.

All flotation concentration processes are selective or differential in that one mineral or group of minerals is floated away from accompanying gangue. Ordinarily, however, the separation of unlike minerals, such as sulphides from nonsulphides, is referred to as "bulk flotation" and the term "differential flotation" is restricted to operations involving separations of similar mineral types. Differential flotation may be exemplified by the concentration and subsequent successive removal of copper, lead, zinc and iron sulphides from a single ore.

THICKENING

It is sometimes necessary to increase the solids content of an ore pulp. The machine that does this is called a thickener. Operating continuously, a thickener is a large diameter, comparatively shallow, round tank. As the feed enters, the entrained rock particles sink to the bottom of the thickener and are raked to a discharge mechanism located in the centre of the tank floor. Some of the extremely fine particles in the feed are aided in settling by the addition of chemicals such as lime. The underflow from a thickener tends to resemble a sludge; the resultant clear solution in the thickener overflows the top of the tank and is collected in a launder.

FILTRATION

Some form of filtration is required in most mine-mill circuits. In many cases, a filter will take the form of a large, horizontally-mounted, revolving drum. The drum is porous and partially submerged in a semi-circular steel tank which receives pulp from specific mill processes. As the drum rotates, a vacuum is applied from within which causes a definite thickness of pulp to adhere to the drum. The resultant "cake" is scraped off continuously. The final concentrate from a sulphide mine-mill operation is generally formed in this way.

CYANIDATION

A variety of milling flowsheets are applied in recovering gold, but all rely on cyanidation to dissolve the gold from the ore. Prior to leaching, the ore is ground to facilitate the dissolution of all economically recoverable gold within a reasonable time. Typical fineness of ground ore is 80 percent less than 0.075 millimetres (200 mesh). Some mills grind the ore in cyanide solution which allows the cyanide to attack freshly exposed gold surfaces. In a few mills, preconcentration of coarse gold by gravity methods is practiced to improve overall recovery and reduce the size of the cyanidation circuit. Jigs are generally used for this purpose.

The quantity of cyanide required for dissolution of the gold depends on the grade of the ore and the amount of cyanicides present in the ore. Cyanicides are compounds, for example, metal and sulphide minerals, which react with cyanide, causing excessive reagent consumption and fouling of the leaching solution. They, or the products formed by their reactions, may also interfere with the dissolution or subsequent precipitation of gold. Pre-aeration of the pulp is usually practiced to minimize the deleterious effects of cyanicides. Both pre-aeration and cyanidation are carried out in agitated tanks. Leaching generally takes between 24 and 72 hours.

Canadian gold mills practice one of two methods to recover gold from the leach solution. Either the Merrill-Crowe or the Carbon-in-Pulp (CIP) process is used, with the former being the more common. However, the CIP process is gaining favour in that it offers the advantages of lower capital and operating costs than the Merrill-Crowe process.

The Merrill-Crowe Process

The Merrill-Crowe Process has been widely used for 90 years. It consists of precipitating gold from a de-aerated solution by the addition of zinc dust. Following cyanidation, the gold-bearing solution (pregnant solution), is separated from the tailings solids, usually by vacuum filtration followed by clarification. Solid-liquid separation is sometimes done by counter-current decantation in the thickeners rather than by filtration.

The clarified solution is de-aerated under vacuum. Zinc dust is then added to precipitate gold which is then collected in a filter press. The gold precipitate is periodically removed and fire refined in a furnace to produce a bullion containing over 90 percent precious metals (gold and silver).

Following gold precipitation, most of the gold-free (barren) solution is recycled back to the cyanidation process to take advantage of its residual leaching ability for gold. However, part of the barren solution has to be discarded to prevent the build-up of contaminants that interfere with gold dissolution and/or precipitation.

The Carbon-in Pulp Process

In the CIP Process, dissolved gold is removed directly from the leach pulp by contact and adsorption on activated carbon granules. This is done in a series of agitated tanks with the pulp moving counter current to the activated carbon. The carbon is coarser than the pulp and is retained in the adsorber by an appropriately sized screen. The pulp flows continuously from one adsorber to the next, each tank having a retention time of about one hour. The carbon is advanced in a batch manner, generally once a day. Following carbon adsorption the barren pulp is discharged to the tailings pond. There is consequently no recycling of the barren cyanide solution and this results in greater losses of cyanide to the tailing pond than is the case with the Merrill-Crowe process.

The adsorbed gold is stripped from the carbon using a hot caustic cyanide solution under either pressurized or atmospheric conditions. It is then recovered from the stripping solution by electrolytic deposition on steel wool cathodes which are periodically removed and refined by fire or by electro-refining.

DISSOLUTION IN ACID: ION EXCHANGE

Uranium is usually recovered from its ore by contacting the ore with sulphuric acid and, after a series of steps, use of an ion exchange resin.

In addition to all of the above, amalgamation (use of mercury) may be utilized to recover gold, physical processes may be used to recover heavy minerals and so forth. The possibilities are almost endless. For example, evaporation is used to recover salt from brine and pyrometallurgy (smelting and refining) is used to win many metals from ores or concentrates.

IV PRINCIPAL RAW MATERIALS

The Ontario Mineral Industry Sector: Group "A" is an industrial sector that is largely "inorganic" in nature. The ores being processed are composed of inorganic compounds such as sulphides and oxides. Bulk chemicals are used by many Group "A" plants. These bulk chemicals are normally restricted to sulphuric acid, nitric acid, hydrochloric acid, ammonia, calcium oxide, sodium carbonate and sodium hydroxide. Cyanide in the form of a sodium, potassium or calcium salt is used in large quantities by the gold industry and, in smaller quantities, by some base metal sulphide plants.

Organic chemicals are used by Group "A" plants in the froth flotation process. Most flotation chemicals fall into at least one of the three following categories:

1. Frothers
2. Collectors (Promoters)
3. Modifiers

FROTHERS

In a flotation cell, the production of a persistent froth of desired selectivity is extremely important. Involving the introduction of small air bubbles into the flotation pulp in the cell, the requisite frothing action is enhanced by the addition of a specific type of chemical, called a frother, into the ore pulp. In effect, a frother is a chemical that acts to produce a froth of satisfactory stability. The frother toughens the bubble wall (which is stabilized further by the mineral particles adhering to it) and thus prolongs the life of each bubble. A useful frother creates a froth which survives long enough to permit the removal of its mineral load and yet breaks down within a reasonable length of time so that a permanent foam is not created.

Although some inorganic substances may cause frothing, the really effective agents are organic substances. In general, frothing agents have structural formulae that are characterized by the presence of two constituents having opposite properties: one part of the molecule is nonpolar, and the other is polar. Typical examples are amyl alcohol, $C_5H_{11}.OH$, cresol, $CH_3.C_6H_4.OH$, and toluidine, $CH_3.C_6H_4.NH_2$.

The frothing properties are related to the composition and structure of both parts of the molecule. Among homologous substances (i.e., substances having the same general structure, and therefore the same polar group, but varying hydrocarbon chains), the frothing ability at the concentration which yields maximum frothing increases with increase in the length of the hydrocarbon chain, up to a certain point, but decreases if the length of the chain becomes very great. This is particularly well shown in the series of the aliphatic alcohols, in which frothing increases with increase in the length of the hydrocarbon chain, up to the 7 or 8-carbon-atom alcohol, but decreases thereafter. Substances having the same polar group and about the same solubility, but different structure in the nonpolar part of the molecule, have somewhat similar frothing qualities. Thus, hexyl alcohol, $C_6H_{13}OH$, or heptyl alcohol, $C_7H_{15}OH$, is roughly equivalent to terpineol, a cyclic terpene alcohol, $C_{10}H_{17}OH$.

Frothing can be traced directly to the dual character of frother molecules which have one water-avid and one water-repellent portion. Both these affinities are satisfied if the molecules occur at bubble walls with their polar, hydrated end adhering to the water phase and their nonpolar end away from it. As a result, frother molecules concentrate at the interface between the fluid phases of flotation systems. As a result of the addition of a frother, the gas bubbles formed under the surface of a liquid are partly lined with a monomolecular sheath of frother molecules. This allows each bubble with its lining to approach other bubbles without coalescing. To some extent, the effect produced by the addition of a frother is proportional to the amount of frother. However, past a certain point, the effect of further additions of frother is less than that of preceding additions. Eventually, the addition of

further amounts results in a decrease of the frothing action, and finally in the total absence of frothing. The point at which total absence of frothing is obtained corresponds to the saturation by the dissolved substances of the solutions.

The constituents of frothers are volatile substances, and many are pleasantly fragrant. They are in fact found also in the so-called essential oils which are used extensively in perfumery. Accordingly, a substantial part of the frothers added in flotation operations is volatilized so that re-use of flotation tailing waters does not necessarily reduce proportionately the requirement for frothers.

Generally speaking, it is desirable that a frother does not display a significant 'collecting' ability. However, under some circumstances, a frother with a collecting ability may be used to advantage.

Water-insoluble, saturated hydrocarbons such as kerosene will not form a suitable froth. Unsaturated hydrocarbons tend to form a light froth. Organic compounds such as pine oil, alcohols, phenols, and fatty acids generally form appreciable amounts of relatively stable froth.

In practice, the most widely used frothers are pine oil, cresylic acid and certain alcohols such as methyl amyl alcohol. Locally, eucalyptus oil and camphor oil may be used as frothers. A class of reagents known as froth stiffeners can impart stability to a froth in some circumstances. Creosotes are typical of these materials.

COLLECTORS (PROMOTERS)

Of flotation agents, the most important are the 'collectors' (sometimes called 'promoters') which attach themselves to specific normally non-floating minerals thus endowing them with hydrocarbon-like surfaces and making them capable of adhering to the gas bubbles that are generated by a flotation cell.

Natural floatability is exhibited by solids that possess an outer surface that is nonionic in character. For practical purposes, this means a hydrocarbon surface. Collector molecules should therefore consist, at least in part, of hydrocarbon or similar groups.

In practice, each collector molecule contains a polar and a non-polar group. When attached to a mineral particle, these molecules are so oriented that the non-polar or hydrocarbon group is extended outward. Such orientation results in the formation of a hydrophobic hydrocarbon film on the mineral surface.

Collectors in use include the following:

Potassium Amyl Xanthate
Potassium Sec-Amyl Xanthate
Potassium Ethyl Xanthate
Potassium Isopropyl Xanthate
Potassium Hexyl Xanthate
Sodium Sec-Butyl Xanthate
Sodium Isobutyl Xanthate
Sodium Isopropyl Xanthate
Sodium Ethyl Xanthate
Sodium Di-Ethyl-Dithiophosphate
Sodium Di-Secondary Butyl Dithiophosphate
Sodium Di-Isopropyl Dithiophosphate
Sodium Di-Amyl Dithiophosphate
Isopropyl Ethylthionocarbamate

MODIFYING (REGULATING) AGENTS

Chemical products which are used to modify or control the normal behavior of minerals in a flotation operation are broadly classed as modifying (regulating) agents. The list of modifying agents used in flotation is long and varied and generally includes all reagents whose principle function is neither collecting nor frothing.

Modifying agents can be put into general categories as follows:

a) pH Modifiers

These tend to be bulk chemicals such as sodium hydroxide and sulphuric acid.

b) Activating Agents

This class of reagents is added to a flotation system to permit better collector attachment to the mineral to be floated. Examples are:

1) Copper Sulphate
2) Sodium Sulphide
3) Lead Nitrate
4) Lead Acetate
5) Aluminum Chloride

c) Depressing Agents

Depressing agents assist in the separation of one mineral from another when the floatabilities of the two minerals to be separated are quite similar for any given collector or collector combination. Examples are:

1) Sodium and Calcium Sulphites and Hyposulphites and Sodium Hydrosulphite
2) Zinc Sulphate
3) Sodium Silicate
4) Hydrofluoric Acid
5) Sulphur Dioxide
6) Quebracho and Tannic Acids
7) Ferrocyanides
8) Ferricyanides
9) Permanganate
10) Chromate
11) Natural Colloids

d) Dispersants

In sulphide mineral flotation, the separation is ordinarily made in the presence of slimes (very fine particles). However, for nonsulphide flotation where selectivity between species must be accomplished by subtle means, slime control is almost always necessary. In some cases (for example, the separation of clay from quartz), a dispersant can be added to the flotation system to ensure that coflocculation of the desired mineral and gangue does not occur. Dispersants in use include:

1) Hexametaphosphate
2) Lignin Sulfonates
3) Sodium Silicate
4) Tannin

e) Flocculants, Coagulants, Coagulant Aids

A large number of these compounds are used. These compounds are not unique to the mining industry and are used by most industries in the Province. Examples are:

1) Alum
2) Bentonite Clays
3) Activated Silica
4) Cationic Poly-electrolytes
5) Non-ionic Organic Polymers

It is necessary to note that most flotation chemicals are added in "starvation" quantities to mill pulps. In general, only a few grams per tonne of ore are added of any particular reagent. However, some base metal sulphide mills are large and, as a result, on a daily basis, reagent use can be substantial.

V PROCESS CHEMISTRY

Plants in Group "A" rely heavily on physical processes to release and concentrate mineral particles. Typical operations include crushing, grinding, filtration, clarification and processes that rely on differences in specific gravity of different mineral particles. Flotation is a physico-chemical process that relies on surface effects induced by very small quantities of organic and inorganic chemicals. On the other hand, gold is often recovered by inducing it to dissolve in a cyanide solution and uranium is usually recovered by inducing it to dissolve in a sulphuric acid solution.

With the exceptions of gold and uranium plants, process chemistry within Group "A" tends to be simple.

VI WASTEWATER

There are two common sources of wastewater at most Group "A" plants. They are:

1) the mine and its associated facilities and
2) the tailings disposal area and its associated facilities.

THE MINE

Natural surface water percolates into most mine workings at rates which are almost impossible to predetermine. Rain and snow fall directly into open pits. In most cases, this natural water comes into intimate contact with any exposed minerals that occur in the orebody or in the associated waste rock. Obviously, it is somewhat easier to predict the amount of natural water that will gain access to an open pit than it is to predict the amount of natural water that will gain access to underground mine workings. In northern Ontario, for instance, we normally expect that each hectare of land will receive a daily average of over 20,000 litres of water due to natural precipitation. Of course, we do not know what percentage of this will leave any particular area as runoff or what percentage of this will evaporate or what percentage will be retained by the land itself. But it is obvious that a 20 hectare open pit will receive an average of 20 x 20,000 = 400,000 litres of natural water per day.

In addition to natural water influents, water is pumped underground for mining purposes. In many cases, this aspect of underground water consumption is quite predictable. For instance, water is used underground for drilling, dust suppression, pumping, cooling and sanitation.

The quantity of water used in drilling operations can be predicted with reasonable accuracy on the basis of such things as manufacturers recommendations.

Drilling time can be computed from the diamond drilling experience which normally precedes the exploitation of any orebody. From the exploration drilling and subsequent to the selection of the mining system it should be possible to forecast the drilling hours required for:

a) development footage
b) stope development footage
c) production drilling footage

Water usage for the purposes of dust suppression can be determined on the basis of:

a) the number of rounds taken per day
b) the number of transfer points in the ore transportation system.
c) crushing plant instaliation and ventilation
d) general allowances for hose clean up and geological examinations, and
e) ventilation humidity requirements.

With regard to pumping, the water requirement relates to gland water and is more or less directly dependent on the number of pumps being used, the size of the various pumps and the operating pressure of the pumps.

The amount of (cooling) water used underground for regulating the bearing temperature on equipment such as crushers, fans and compressors can be accurately predicted on the basis of manufacturers specifications.

In many instances, a predictable volume of water may be used in mines where underground sanitary facilities are provided. This volume of water is more or less directly related to the number of manshifts in any given period.

Where backfill is used in a mine, water (generally mill water) will be used to convey tailings from the mill to the underground workings.

In summary, the natural water that percolates into a mine (open pit or underground) and the water that is deliberately pumped into an open pit or underground for process use comes into contact with the

mineralized rock. This water must be removed from the mine or the mine would flood. The water is therefore collected in one or more sumps and is pumped to the surface (or out of the pit). This water, while it is resident in the mine is contaminated by the mining process itself. It may contain quantities of mine-machinery lubricants, trace quantities of various explosives, rock-fines, mine-water treatment chemicals, and indeed, traces of all of the chemical materials that are used in and around a mine. If mill water is used to convey tailings underground for use as backfill, then the minewater can also become contaminated with all of the reagents that are used in the mill. Since backfill is not used in open pit operations, the overall chemical characteristics of minewater from open pit and from underground operations tend to differ somewhat.

Minewater may be acid due to the decomposition of iron sulphides if they exist in the ore or it may be quite alkaline.

THE TAILINGS DISPOSAL AREA

In Ontario, any mill slurry produced by a mine-mill operation must be directed to an engineered impoundment area called a "tailings area". A common size for these tailings areas in the Province is from 40 to 120 hectares. Formal tailings areas that cover less than 5 hectares do exist in Ontario as do major tailings areas that cover more than 500 hectares. Tailings dams in Ontario are commonly less than 15 metres in height although dams in excess of this height are known in nearly all of the mining camps.

The decant from the tailings area is normally the largest and most important single wastewater flow at a mine-mill operation. This wastewater reflects the chemistry of the mill and quite often the mine and is influenced by practices such as recycling and backfilling. The quality of the wastewater may be influenced by the spontaneous decomposition of mineral species being held in the area itself. The chemistry of a tailings area decant will vary from mine to mine and from mining camp to mining camp. The pH of the untreated effluent, like minewater, may be acid or alkaline. The untreated effluent may contain suspended solids, residual mine-mill reagents, heavy metals, ammonia, arsenic and, in the case of nuclear properties may contain radio-active substances. Wastewater from a tailings area is often returned to a mill for re-use. Seepage from the bases of dams will be returned to the tailings area or, more commonly, will be directed to the tailings area treatment system for treatment.

OTHER SOURCES OF WASTEWATER FOUND IN GROUP "A" INCLUDE:

RUNOFF

In some cases, inactive tailings areas associated with Group "A" plants are equipped with permanent waste treatment facilities that intercept or collect runoff and subject it to treatment before discharge to the environment. Without exception, this type of runoff associated with Group "A" plants is acid runoff caused by the spontaneous decomposition of iron sulphides found in uranium mine tailings areas. This runoff is characterized by a low pH, a high sulphates and total dissolved solids content and the presence of various amounts of metals and radionuclides.

In only one case in Group "A" plants, runoff that originates on parking lots and loadout areas in the vicinity of mine-mill buildings, is collected, treated and separately discharged to a watercourse. In all other cases of this nature, runoff is collected and directed to a treatment facility at the site that serves either the mine, the mill or the tailings area. The chemical characteristics of runoff of this nature depends on the mine-mill processes and the type of ore being handled. Suspended solids and associated metals are routinely the main problems encountered with this type of waste.

SMELTER/REFINERY EFFLUENTS

Most major smelters and refineries in Group "A" discharge their wastes to tailings areas associated with their respective mines and mills. These effluents then become part of the tailings area decants and are treated as such. However, two plants in the copper, nickel, lead, zinc subsector, one plant in the silver subsector and two plants in the uranium subsector do discharge effluents directly to a watercourse. The wastewaters generated by the plants in each subsector are different and are related to the unique chemistry or metallurgy of the processes being used at each plant.

In the Effluent Monitoring Regulation:

- Minewater is called "minewater effluent"
- Tailings area decant is called "process effluent"
- Runoff is called "stormwater effluent"
- Wastewater from smelters and refineries is called "smelter/refinery effluent"

VII IN-PLANT CONTROLS

In-plant controls are cost-effective methods of limiting the discharge of pollutants through process modifications, chemical substitution and water reduction and recycling.

Process modifications have included measures to improve the efficiency of mine-mill operations thereby reducing the amount of pollutants discharged in the wastewaters. Chemical storage areas are contained and all spills are directed to retention or waste treatment systems.

Chemical substitution involves the replacement of certain process chemicals known to be toxic and persistent with chemicals with lower toxicity or greater treatability. This has long been a practice of the mining industry.

In-plant recycling of wastewaters is common. Recycling of tailings area effluents is common in the copper, nickel, lead, zinc subsector and the iron subsector. Recycling of tailings area decants in all other subsectors is practiced to a limited extent or is precluded by metallurgrical considerations.

VIII WASTEWATER TREATMENT

In most Ontario mining operations, wastewater treatment revolves around pH control and the control of suspended solids. At many operations, this is all that is required. At some operations, the pH is in the proper range and control of suspended solids is all that is required. When ores or wastes are acid-producing, neutralization of effluents is carried out. Neutralization using lime is common although other bases can and have been used.

Since most tailings areas have calculated retention times in the order of months or years and since tailings area overflows are commonly baffled to prevent the escape of floating materials such as oils, some milling reagents and general debris, tailings areas by themselves can have a significant impact on contained wastes. Processes such as photo-decomposition, aeration, sedimentation and bio-chemical degradation are all active in a well-designed tailings area. Where a tailings area alone cannot accomplish required waste treatment, the decant is directed to downstream polishing ponds where additional treatment is carried out. Many tailings area effluent volumes are reduced substantially by the practice of wastewater recycle.

Special treatment problems can and do arise in Group "A". The gold subsector uses substantial amounts of cyanide to win gold from ore. As a result, cyanide treatment is commonly required within the

subsector. When cyanide complexes are simple, ponding of wastes in contact with the atmosphere may be all that is required. However, in many cases, treatment of cyanide using reagents such as hydrogen peroxide, chlorine or sulphur dioxide is required and is carried out. Acid mine drainage is a common problem within Group "A" and many neutralization plants have been put in place to achieve neutral metal-free effluents. Some of these acid flows are radioactive and control of the radionuclides is carried out. Barium chloride, for instance, is added to control radium in effluents.

Experience has shown that minewater can be handled in at least one of the following ways:

1) The minewater can be directed to the mill for re-use, or
2) The minewater can be directed to the tailings area, or
3) The minewater can be collected and treated by itself.

All three methods of handling minewater have advantages and disadvantages. All three methods are presently being used in Ontario.

In Ontario, minewater is collected and treated by itself if:

1) the mine is located a considerable distance from the mill, or
2) the chemical characteristics of the minewater are such that the water cannot be used as make-up in the mill circuit, or
3) the mill is operating in closed circuit with its tailings area in order to accomplish a specific objective.

In Ontario, minewater is directed to a tailings area when:

1) a mine is close to its corresponding tailings area, or
2) when the minewater is not acceptable for direct use in the mill circuit, or
3) when separate treatment of the minewater would simply force a total duplication of the tailings area decant treatment facilities.

In Ontario, minewater is directed to the mill whenever and wherever possible.

In Ontario, the control of seepage from tailings areas is, in a sense, straightforward. In each case the seepage must be collected. After collection, the seepage can be handled in one (or more) of three ways:

1) The seepage can be treated by itself, or
2) The seepage can be pumped back into the tailings area, or
3) The seepage can be directed to the treatment facility that effects control of the tailings area decant.

Depending on local circumstances, all three methods of seepage control are used in Ontario.

Many metals found in Group "A" effluents are present in these effluents in particulate form; that is, the metals are present as finely divided ore or waste particles. Careful suspended solids control at most Group "A" plants will generally result in satisfactory control of metals in effluents. Where metals actually occur in a dissolved form, careful neutralization and settling will resolve most problems. Some compounds found in the Sector do not respond well to these treatment strategies. Chief among these is ammonia which is a common constituent of most minewater effluents and is frequently detected in decants from tailings areas. Reagent substitution has been carried out in cases where ammonia itself has been used as a chemical in a mine or in a mill. However, ammonia in minewater has, as its primary source, the explosives used to break rock. Aside from good housekeeping practices, treatment strategies for ammonia control are lacking given the ammonia concentrations and flow volumes involved.

IX THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" IN ONTARIO

Group "A" consists of more than 90 plants which discharge wastewaters to natural watercourses in Ontario. All but three of these plants are located in northern Ontario. Most of the plants are located in northeastern Ontario.

Four plants in Group "A" discharge directly to the Great Lakes. The remainder are either indirect dischargers to the Great Lakes or are discharged to the Arctic watershed.

X SECTOR OVERVIEW

Because of the large number of plants involved and because of similarities between certain plants, Group "A" has been subdivided into six subsectors. Generic monitoring schedules have been prepared for each subsector and, together, these schedules make up Schedule A of the Group "A" Effluent Monitoring Regulation. The six subsectors are as follows:

1. Copper, Nickel, Lead, Zinc Subsector

   Number of Plants: 19

Effluent Type	Number of Sampling Points
Process Effluent	8
Minewater Effluent	8
Smelter/Refinery Effluent	2
Stormwater Effluent	2

   Ore Type: Massive and disseminated sulphides

Common ore minerals:	Galena	PbS
	Sphalerite	ZnS
	Chalcopyrite	$CuFeS_2$
	Pentlandite	$(Ni, Fe)_9 S_8$
Common gangue minerals:	Pyrite	FeS_2
	Pyrrhotite	$Fe_7 S_8$

   Mining Methods: Open pit and underground; sometimes in combination
   Use of backfill common

   Milling Methods: Flotation common; circuits may be complex

   Smelting/Refining: Done on the property or concentrates shipped to off-site smelter or refinery

   Waste Treatment: Effluents can be acid; neutralization commonly required
   Effluents may contain organic mine-mill reagents
   Effluents may contain metals such as copper, nickel and zinc
   Large tailings areas common; some in excess of 500 hectares

2. Gold Subsector

Number of Plants: 51

Effluent Type	Number of Sampling Points
Process Effluent	26
Minewater Effluent	31
Smelter/Refinery Effluent	0
Stormwater Effluent	0

Ore Type:
- Largely vein deposits
- Some massive deposits

Common ore mineral: native gold
Common gangue minerals: quartz, silicates

Arsenopyrite (FeAsS) is present in some deposits

In many cases, gold is intimately associated with sulphide minerals

Mining Methods:
- Usually underground; sometimes open pit
- Use of backfill common

Milling Methods:
- Some gravity separation
- Cyanidation used by most plants
- Merrill-Crowe process common
- Carbon-in-Pulp process used at several plants
- Flotation at some plants
- Roasting of concentrates at some plants

Smelting/Refining: Production of gold bullion at most plants

Waste Treatment:
- Most effluents strongly alkaline to prevent formation of toxic hydrogen cyanide gas
- Cyanide destruction at several plants using techniques that involve; natural degradation, hydrogen peroxide, chlorine, or sulphur dioxide
- Heavy metals common in untreated effluents
- Many tailings areas less than 20 hectares in size; many tailings areas over 100 hectares in size

3. Iron Subsector

Number of Plants: 3

Effluent Type	Number of Sampling Points
Process Effluent	3
Minewater Effluent	0
Smelter/Refinery Effluent	0
Stormwater Effluent	0

Ore Type: Two plants banded iron sediments

Common ore mineral:	magnetite	Fe_3O_4
Common gangue mineral:	chert	SiO_2

One plant massive siderite

Common ore mineral:	siderite	$FeCO_3$
Common gangue minerals:	quartz	SiO_2
	pyrite	FeS_2

Mining Methods: Two plants: open pit
One plant: underground
Backfill is not used

Milling Methods: Two plants: magnetic separation and pelletizing flotation reagent used
One plant: heavy media separation and sintering

Smelting/Refining: One plant: sintering

Waste Treatment: Acid drainage at two plants (requires neutralization)
High degree of recycle at two plants

4. Salt (Sodium Chloride) Subsector

Number of Plants: 2

Effluent Type	Number of Sampling Points
Process Effluent	3
Minewater Effluent	2
Smelter/Refinery Effluent	0
Stormwater Effluent	0

Ore Type: Beds of salt (sodium chloride) associated with some dolomite and minor quantities of other minerals such as gypsum

Common ore mineral:	halite	(NaCl)
Common gangue mineral:	dolomite	(a calcium-magnesium carbonate)

Mining Methods: Underground room-and-pillar

Milling Methods: Sizing and packing
Some salt products made from brine taken from wells with subsequent evaporation techniques applied

Smelting/Refining: High purity salt is produced by evaporation of brines recovered from brine wells

Waste Treatment: Wastewaters contain sodium chloride
Sodium ferrocyanide is added to the main product (rock salt for road de-icing) at both plants
Sodium ferrocyanide is also added to products other than road salt on occasion
There are no tailing areas

5. Silver Subsector

Number of Plants: 7

Effluent Type	Number of Sampling Points
Process Effluent	2
Minewater Effluent	4
Smelter/Refinery Effluent	1
Stormwater Effluent	0

Ore Type: Commonly vein-type structures

Common ore mineral: native silver
Associated minerals: sulphides and arsenosulphides of a large number of metals including cobalt and nickel
Common gangue mineral: calcite ($CaCO_3$)

Mining Methods: Underground with some open-cuts
Backfill may or may not be used

Milling Methods: Gravity separation
Flotation when needed

Smelting/Refining: Silver produced at one refinery

Waste Treatment: Tailings areas small
Wastes generally alkaline
Arsenic a component of most waste flows; arsenic exists in both suspended and dissolved forms
Effluent volumes are small

6. Uranium Subsector

Number of Plants: 10

Effluent Type	Number of Sampling Points
Process Effluent	4
Minewater Effluent	0
Smelter/Refinery Effluent	4
Stormwater Effluent	4

Ore Type: Beds of quartz pebble conglomerate containing uranium mineralization
Most important gangue mineral is pyrite (FeS_2)

Mining Methods: Underground room-and-pillar
Backfill not generally used

Milling Methods: Pulp is treated with sulphuric acid to release uranium
Uranium is recovered using ion-exchange

Smelting/Refining: Concentrated uranium from the mine-mill complexes is shipped to refineries for production of products such as UO_2

Waste Treatment: Acid mine drainage is a common problem in this subsector due to the pyrite that is found in the ore
Neutralization plants are common and also serve to control heavy metals
Most effluents are weakly radio-active and when radium is a problem, additions of substances such as barium chloride are necessary
Ammonia is a problem at certain plants in this subsector

PART II

TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

PART II - TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

I INTRODUCTION

The purpose of the technical rationale section is to explain the steps in the development of the Ontario Mineral Industry Sector: Group "A".

The section provides background information on the regulation process, the options considered in arriving at the specific Ontario Mineral Industry Sector: Group "A" monitoring approach and the databases and criteria used for parameter and monitoring frequency selection.

II DEFINITION OF THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" - STANDARD INDUSTRIAL CLASSIFICATION (SIC) SYSTEM

A simple definition of the Ontario Mineral Industry Sector: Group "A" is difficult to derive because of the complexity of the ores being mined, the methods of mining being used, differences in mill, smelter and refinery flowsheets and differences in the products being produced.

One approach is to use the Standard Industrial Classification (SIC) codes originally established in Canada for data gathering purposes by Statistics Canada. These codes classify establishments by type of activity and may at best be somewhat arbitrary and perhaps technically ambiguous.

SIC Codes used in Canada that correspond to the subsectors that make up Group "A" are as follows:

SUBSECTOR	SIC CODE
Copper, Lead, Zinc, Nickel	0612, 0613
Gold	0611
Iron	0617
Salt	0625
Silver	0614
Uranium	0616

III THE NEED FOR REGULATION

Currently, the Ontario Mineral Industry Sector: Group "A" plants monitor and report only certain standard parameters and conventional pollutants under the Ministry of the Environment's Industrial Monitoring Information System (IMIS).

The reportable data may include effluent flow volumes and certain routine parameters that tend to reflect the nature of Group "A" effluents. These parameters may include but are not limited to: pH, suspended solids, copper, nickel, lead, zinc, arsenic, phosphorus, phenols, oils and greases, ammonia, other nitrogen compounds (NO_2, NO_3, TKN) and a variety of other metals which depend largely on the type of ore being mined and the nature of the mineral processing operations being used.

In the past, many plants in Group "A" were not reported on IMIS since these plants discharge their effluents to the Arctic watershed. In the past, the focus of IMIS has been on those plants discharging directly or indirectly to the Great Lakes basin. This situation is being corrected.

Site specific monthly average IMIS data are published by the Ministry in its annual report entitled "Report on the Industrial Direct Discharges in Ontario". The IMIS data are reported to the Ministry on a voluntary basis.

Requirements for some of the standard parameters and conventional pollutants reported under IMIS are imposed by Control Orders or Requirements for Direction, Certificates of Approval or Federal Regulations and Guidelines.

Ministry guidelines are taken from various sources including Provincial Water Quality Objectives (PWQO) and previously published guidelines for industrial sectors.

The Ministry water management guidelines are summarized in the publication entitled "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment", referred to as the "Blue Book". Provincial Water Quality Objectives (PWQOs) are currently available for a total of 74 pollutants including 51 EMPPL substances. It is the goal of the Ministry to:

- establish PWQO or Guidelines for all of the EMPPL substances that possess the potential for moderate to high aquatic environmental damage;

- assemble the available aquatic toxicological and other appropriate information for the remaining EMPPL substances, and maintain the capability to set Provincial Water Quality Guidelines for such substances on demand.

There are currently no regulations for specific, toxic and persistent pollutants, generally termed "priority pollutants" In fact, there exists only a very limited data base on the concentrations and loadings of these priority pollutants being discharged into Ontario's waterways. Most Group "A" plants have virtually no long-term data on the concentration of these pollutants in their effluents.

Clearly there is a need for a comprehensive long-term data base on the discharges of priority pollutants from Group "A" plants. The MISA Effluent Monitoring Regulation for the Ontario Mineral Industry Sector: Group "A" will provide this data base.

The effluent limits regulation will be developed for Group "A" on the basis of the monitoring data base in conjunction with data on Best Available Technology Economically Achievable (BATEA) and Ministry water quality objectives. Because most priority pollutants are amenable to treatment through the use of available technology, the effluent limits regulation will ensure that any required technology is put in place to virtually eliminate the discharge of toxic pollutants.

IV THE U.S. EPA EXPERIENCE

The U.S. EPA has published a Development Document for Effluent Limitations Guidelines and Standards for the Ore Mining and Dressing Point Source Category.

Under these guidelines, it has been established that the "Best Available Technology Economically Achievable (BATEA) for toxic pollutants is the "Best Practicable Technology" (BPT). BPT facilities consist of a direct discharge point source with end-of-pipe treatment, consisting of lime precipitation, where needed, and settling.

In developing its effluent limitations guidelines and standards for toxic pollutants, EPA originally addressed a list of 129 toxic pollutants, referred to as the "priority" pollutants list, that was developed in the late 1970's. An extensive sampling and analysis program was undertaken in 1977 to determine the presence and concentrations of the 129 priority pollutants in the Ore Mining and Dressing

point source category for possible regulation. Of the 129 toxic pollutants studied, 124 were excluded in all subcategories for one of the following reasons:

- they were not detected (by analytical methods available)
- they were present at levels not treatable by known technologies
- they were effectively controlled by technologies upon which other effluent limitations are based.

The toxic pollutants to be limited by BPT in effluents consist of: cadmium, copper, lead, mercury, and zinc. Conventional pollutants to be limited by "Best Conventional Pollutant Control Technology" (BCT) include: Total Suspended Solids (TSS) and Hydrogen ion (pH). BCT replaces BPT for the control of conventional pollutants.

V THE MINISTRY/ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A" DIALOGUE

The Ministry adopted an open consultative process with industry in developing the Group "A" Effluent Monitoring Regulation. Additional input was available in the Regulation formulating process through the MISA Advisory Committee (MAC). The MISA Advisory Committee is a panel of qualified professionals and environmentalists established to provide a third opinion to the Minister on regulations developed by the joint efforts of industry and the Mininstry before and after they are released for "public" review.

A Joint Technical Committee (JTC) consisting of industry, Environment Canada, The Atomic Energy Control Board and Ministry representatives served as the means for reaching consensus. A member of the MISA Advisory Committee also took part in the JTC discussions.

Agreement was reached with industry on principles which were to serve as general guidelines for the monitoring regulation. A multi-discipline group of Ministry/Environment Canada/Atomic Energy Control Board experts developed the general rationale for the site-specific monitoring requirements. A joint Government/Industry Regulation Writing team then produced the Regulation text for review by the JTC.

On the basis of the rationale and the databases available to the Ministry, the subsector specific monitoring requirements were drawn up. The specific monitoring requirements were then reviewed and modified as required.

VI APPROACHES TO MONITORING

The simplest monitoring approach both for implementation and regulation would have been to have a uniform requirement for all of the more than 90 plant sites that make up Group "A" of the Ontario Mineral Industry Sector. However, some individual plants in Group "A" employ less than 20 people, some employ several thousand; some plants mine or process less than 300 tonnes of ore per day, some mine or process more than 10,000 tonnes per day. In addition, large differences in the types of ore being processed, the methods of mining, milling, smelting and refining all resulted in the general conclusion that a uniform regulation that would apply to all sites would be too difficult to achieve and that a regulation that applies to each plant on a site specific basis would be equally difficult to arrive at and still maintain a sense of "fairness" to all those being regulated. As a consequence, Group "A" was divided into six subsectors (as outlined in Sections IX and X in Part I) and generic effluent monitoring schedules were prepared for each subsector.

It is necessary to note that the Ontario Mineral Industry Sector under MISA covers all mining operations in Ontario and all facilities that are directly associated with Ontario mining operations. For example, the Sector includes all underground and open pit mining operations, all primary smelters and refineries, asphalt plants, brick plants, lime plants, cement plants, pits and quarries.

Ontario is one of the richest and most complex mining areas in the world. As such, the number of companies and mineral properties (all called "plants" in the Effluent Monitoring Regulation) covered by the Ontario Mineral Industry Sector is large.

Two groups ("A" and "B") operate under the Ontario Mineral Industry Sector. A separate regulation is being prepared for each group.

All plants in the Ontario Mineral Industry Sector fall into Group "A" or into Group "B". Metal mines and salt mines are found in Group "A". Industrial mineral mines are found in Group "B".

Because of the diversity of the Ontario mining industry and the large number of plants involved, Group "A" has been subdivided into six very distinct subsectors as follows:

(1) Copper, Lead, Zinc, Nickel
(2) Gold
(3) Iron
(4) Salt (sodium chloride)
(5) Silver
(6) Uranium

The unique nature of each subsector is derived from a combination of differences that involve mineralogy and geology, methods of mining and methods of processing (these differences are outlined in Part I, sections IX and X).

All plants and effluents covered under the Effluent Monitoring Regulation are listed in Schedule B.

All generic effluent monitoring schedules together make up Schedule A of the Effluent Monitoring Regulation.

VII THE EFFLUENT-SPECIFIC MONITORING APPROACH

For each subsector in Group "A", effluent monitoring schedules were developed. Conventional as well as priority pollutants were assigned for monitoring on the basis of their presence and their concentrations in the respective site effluents as determined from historical and current monitoring data available to the Ministry. In addition, supplemental data on raw materials, by-products and products were also used for parameter assignments. Thus, in keeping with the diversity of the plants in the sector, the routine monitoring requirements for specific parameters could be different for each effluent but would reflect the high probability of finding those parameters in that effluent.

Included in the effluent monitoring schedules were requirements for toxicity testing using both the fish (Rainbow Trout) and Daphnia magna acute lethality toxicity tests on all discharges from Group "A" plants.

VIII PARAMETERS FOR MONITORING

The priority pollutants assigned for monitoring of effluents in Group "A" were taken directly from the Ontario Effluent Monitoring Priority Pollutants List (1987) (EMPPL).

The derivation of the EMPPL is fully documented in a Ministry report dated July 1988. The EMPPL includes chemicals detected in Ontario municipal and industrial effluents and Ontario's waterways which pose a hazard to the receiving environment because of their toxicity and persistence. The potential presence of a chemical based on use and manufacturing data could also have placed it on EMPPL. The EMPPL currently lists 179 chemicals. New chemicals identified in Ontario effluents and waterways will be assessed under EMPPL criteria and, if warranted, placed on the EMPPL on an ongoing basis.

The only compounds, chemicals or substances deleted from the EMPPL for the purposes of Group "A" monitoring were as follows:

(a) specific conductance (Group 7)	- is used as an indicator of dissolved solids - Group "A" is monitoring dissolved solids
(b) total alkyl leads (Group 13)	- they are not a Group "A" product and are not likely to be in effluents
(c) sulphide (Group 15)	- in certain Group "A" subgroups, metal sulphides may make up over 50% of the waste being discharged to a tailings area - in most subgroups, sulphides are a component of ores or wastes - Group "A" is monitoring for both sulphur and sulphates and metals found as sulphides in the various ores, as such, monitoring for sulphide itself is not necessary
(d) herbicides (Group 21) and organochlorine pesticides (Group 22)	- none of theses substances are manufactured or used in Group "A" plant processes
(e) fatty and resin acids (Group 26)	- they are not a Group "A" product

In addition to chemicals found on the current EMPPL, Group "A" will be doing open characterizations on organic and inorganic elements or compounds that lie outside of the EMPPL and will carry out monitoring for substances that are somewhat specific to Group "A". These include chlorides, cyanates, thiocyanates, iron, uranium and weak acid dissociable cyanides.

IX DATABASES USED FOR PARAMETER SELECTION

The major source of information on the presence and concentration of conventional and priority pollutants in Group "A" effluents was the pre-regulation effluent characterization data. Data from existing Ministry and industry records were also used. Pre-regulation effluent characterization was carried out in the 1987 at all major Group "A" plants that used organic reagents for process purposes. Two sample runs were made and each featured open characterization of organic and inorganic components.

Best professional judgement (BPJ) based on knowledge of process chemistry, products, by-products and raw materials for each subsector was also important in parameter selection.

X CLASSIFICATION OF EFFLUENTS

Unlike many other sectors, cooling water effluents, in general, are only a minor component of Group "A" plant effluents and, as such, are not featured in the Effluent Monitoring Regulation. In general, cooling water will make up less than 1% of the flow of Group "A" plant effluents.

All Group "A" effluents fall into one of the following categories:

(a) Minewater Effluent

Underground and open pit mines may generate an effluent that is called "minewater effluent". In simple terms, minewater effluent is water that flows or is pumped from the mine workings. Water gains access to mine workings by percolating through surrounding rock, by its association with materials that may be required by the mining process itself and by its deliberate introduction into the mine for use in the mining process. To prevent the mine workings from flooding, this water must be removed from the mine. In some cases, this water is re-used in other processes and is not discharged directly to the environment. When this cannot be done, this water is treated, if necessary, and then discharged to the environment.

(b) Process Effluent

Many mining operations generate large amounts of finely divided waste rock called "tailings". These tailings are routinely transported in the form of a slurry of solids and water to a storage area called a "tailings area". The solids settle in the tailings area while the associated liquid in the area is allowed to leave the area and forms an effluent that is known as a tailings area decant. In the Effluent Monitoring Regulation, a tailings area decant is called a "process effluent". A tailings area decant is treated, if necessary, before being discharged to the environment. In addition, a portion of the decant may be returned to the plant for re-use. The volume of a tailings area decant is normally directly related to the amount of water being used in processing at the plant and the amount of water being recycled. However, this volume can be augmented by natural precipitation gaining access to the tailings area and by any natural watercourses gaining access to the tailings area.

(c) Smelter/Refinery Effluent

Most smelters and refineries in Group "A" discharge their wastes to a tailings area or to a treatment facility associated with a tailings area. Here, the smelter/refinery effluents become subject to recycle and all the other treatment strategies that a tailings area decant may undergo and exit the area as a "process effluent". As such, the smelter/refinery effluent category is reserved for those smelter/refinery effluents that are not discharged to a tailings area or associated treatment facilities but are discharged directly to the environment with or without treatment.

(d) Storm Water Effluent

Storm water effluents in Group "A" largely originate on inactive tailings areas that may cover hundreds of hectares. The effluent volumes are precipitation driven but can be augmented by natural sources of water such as springs and streams that may exist in the areas. Because of the large areas that are normally involved, storm water effluents in Group "A" tend to be continuous effluents but this is not always so. In terms of Group "A", storm water effluent is runoff from inactive tailings areas or from active plant areas such as parking lots and concentrate loading areas that is collected and, if necessary, treated before discharge to the environment. Storm water effluents must not, under any circumstances, include inputs, no matter how minor, of "process effluent", "smelter/refinery effluent" or "minewater effluent".

It should be noted that the Effluent Monitoring Regulation covers the effluents from all existing plants in Group "A" and the effluents from Ministry of the Environment approved treatment facilities operating at inactive or abandoned plants in Ontario. The Effluent Monitoring Regulation, however, does not cover the very large number of inactive or abandoned plants in the province that lack treatment facilities or effluent collection strategies. These plants are not covered by the Effluent Monitoring Regulation for the following reasons:

(1) These properties are not active. They are either inactive or abandoned. Process effluents, minewater effluents or smelter/refinery effluents are not being discharged. Storm water effluents, if they exist, are not being collected or treated. Storm water effluents at these plants are nonpoint sources.

(2) Many of these properties are in remote locations, access is difficult and electrical power is usually not available.

(3) The jurisdiction for the reclamation of these properties lies outside of the Ontario Ministry of the Environment.

XI FLOW MEASUREMENT

Each direct discharger in Group "A" is required to measure or estimate the flow of each effluent stream at the time of sampling and at a location or set of locations representative of the flow at the sampling point. Methods, devices or calculations for the measurement or estimation of flow must be capable of accuracy to within plus or minus 20 per cent of the actual flow.

Traditionally, mine effluent limits have been based on concentration which is independent of flow. Waste loadings of conventional parameters from the industry have routinely been very low. Environmental problems largely arise because receiving waters in the mining areas are generally soft and, as such, are quite sensitive to even minor inputs of a variety of substances. Past emphasis, therefore, has been on concentration rather than flow. This is likely to continue but the need for accurate measurement of final flow volumes is recognized.

A number of problems with flow measurement do exist for Group "A" plants. For example, many final effluent sample points for Group "A" plants are remote from plant facilities. While some are located within sight of plant buildings, many are located downstream of tailings areas and may be several kilometres from the centre of plant activities. Quite often, electrical power is not available at the site and this makes continuous flow measurement difficult. Because of the severe weather conditions that may exist at these sites for at least four or five months of the year, access to the sites may be difficult or dangerous at certain times. Because of the conditions of extreme cold, continuous flow

measurement would require permanent heated buildings and continuous maintenance of devices such as flumes so that ice build-up would not influence the accuracy of the readings. Even without continuous measurement of flows, ice build-up and plugging of devices by debris will be a problem. The activities of beavers will in many cases cause significant problems.

Since the effluents involved in Group "A" are generally subjected to long retention times and since the retention facilities involved routinely cover more than one hundred hectares and include level control, daily and even significant weekly fluctuations in flow and concentration are not expected. For these reasons, continuous flow measurement is not required in the Effluent Monitoring Regulation. Because of the difficulties that Group "A" plants will encounter due to remote locations, lack of power, severe weather and problems in keeping measuring devices free of debris, flow measurement accuracy requirements have been set at plus or minus 20 per cent.

However, it must be stated that many Group "A" plants will be installing flow measurement devices and the accuracy of these devices in most cases will be well within the ±20% accuracy required. These devices will have to be maintained according to the advice of the manufacturers of the devices and all reasonable care or maintenance of the various devices will be required. They will be operated at or near their stated accuracies.

XII PARAMETER/FREQUENCY ASSIGNMENT - GENERAL COMMENTS

Three basic frequencies of routine monitoring are required in the Ontario Mineral Industry Sector: Group "A" Regulation. They are: 3 times per week, monthly and quarterly.

The Group "A" Effluent Monitoring Regulation varies from all other sectors in that it involves generic sampling schedules for the subgroups that make up Group "A". While some of these subgroups are small, the most important ("copper, nickel, lead, zinc" and "gold") contain 19 and 51 plants respectively. Since the intent of the regulation is to characterize effluents so that BATEA can be arrived at for either Group "A" as a whole or for each subgroup of Group "A" individually, it was felt that daily sampling was not required. For example, over the life of the Regulation, daily sampling for suspended solids in the Gold subgroup would give rise to 365 (days) x 57 (sampling points) = 20,805 results. Since suspended solids is a conventional parameter that has been sampled at Group "A" type plants for decades, there is no need for this frequency of data. At three times per week, 8,892 results will be generated that will be applicable to the Gold subgroup alone. In addition, the lack of chemical and flow variability on a daily or even weekly basis that tends to characterize Group "A" effluents supports the utilization of three times per week sampling as opposed to daily sampling.

In Ontario, two of the most important environmental control parameters used in mining are suspended solids and pH. Metals such as copper, nickel, lead and zinc are also important as is arsenic. Other frequently used parameters include oils and greases, phenols, ammonia, cyanide and phosphorus. All of these parameters are candidates for control in upcoming limits regulations and , as such, figure prominently in the Effluent Monitoring Regulation.

In general, parameters that <u>will or may</u> be carried over to become part of a future "limits" regulation based on best available technology economically achievable (BATEA) are sampled on a thrice weekly basis. This gives rise to 12 data points per month and permits the calculation of statistically valid monthly loadings. Parameters that are sampled on a monthly basis <u>may</u> be carried over to become part of the future "limits" regulation referred to above. Sampling on a monthly basis gives rise to 12 data points per year and permits the calculation of statistically valid yearly loadings. All other parameters are to be sampled on a quarterly basis to ensure that the chemical nature of each effluent has been documented. The quarterly samples will also ensure that any seasonal changes in the effluents that may occur will be documented. Since a number of sampling points exist in each subsector of Group "A", the detailed quarterly sampling that is required will give rise to enough analytical data to permit an

adequate definition of the chemical nature of the effluents that are generated by each subsector. Any unusual, unexpected or abnormal results generated by the quarterly sampling will be subject to further investigation.

The Group "A" regulation also includes requirements for monitoring substances that are somewhat specific to the industry. These substances include cyanates, weak acid dissociable cyanides, chlorides and uranium.

In general, parameters assigned for sampling on a three times per week or monthly basis, are those parameters that have historically been subject to control either at provincial or federal levels. These parameters include pH, suspended solids, copper, nickel, lead, zinc, arsenic, phosphorus, phenols, oils and greases, ammonia and related nitrogen compounds. Using existing data bases and best professional judgement at the JTC level, the frequency of monitoring for certain or unusual parameters was adjusted on a subsector basis and, on occasion, on a site specific basis. Parameters being sampled on a quarterly basis are basically the EMPPL parameters augmented by organic and inorganic characterizations and toxicity requirements.

The necessity for three times per week or monthly monitoring of certain routine parameters is as follows:

pH

- a measure of the hydrogen ion concentration;
- a fundamental parameter which indicates the acidity level in an effluent;
- pH and pH changes may alter the toxicity of many materials to aquatic life;
- pH impacts the availability of nutrients for plants;
- low and high pH values cause corrosion and may make soluble metals dissolve from sludges and bottom sediments;
- PWQO require pH to fall within the range of 6.5 - 9.5 (receiving waters).

Total Suspended Solids (TSS)

- gross measure of suspended material including volatile suspended solids (organic) and inorganic materials;
- organic fractions may include grease, oils, fibres, microorganisms and dispersed insoluble organic compounds;
- inorganic materials include sand, silt, clay and insoluble metal compounds;
- measure of the effectiveness of treatment system separation equipment;
- may be a substrate for toxic contaminants which can leach out in water;
- may increase turbidity of water reducing recreational value;
- may impair photosynthetic activity of aquatic plants;
- can form sludge banks on settling leading to localized anaerobic conditions;
- may kill fish by clogging gills.

Ammonia plus Ammonium (Total ammonia)

- a measure of both ionized and un-ionized ammonia in effluents;
- ammonia is toxic to fish at levels above 0.02 mg/L (un-ionized);
- the concentration of ammonia in its un-ionized state varies with pH and temperature;
- MOE recommends 0.5 mg/L NH_3 (total) as the upper limit for raw water supplies and 0.02 mg/L of un-ionized NH_3 for the protection of aquatic life.

Total Kjeldahl Nitrogen (TKN)

- a measure of both organic nitrogen and total ammonia;
- may present an oxygen demand on the receiving water through nitrification;
- potential nutrient leading to growth of undesirable aquatic plants.

Oxidized Nitrogen (Total Nitrates + Nitrites)

- measures total oxidized nitrogen (nitrate + nitrite);
- Ministry drinking water objectives limit NO_3 + NO_2 to 10 mg/L;
- levels of NO_3 above 10 mg/L in drinking water can impact hemoglobin in children leading to infantile methemoglobinemia.

Total Phosphorus (Total P)

- nutrient which may lead to growth of undesirable aquatic plants;
- phosphorus discharges to the Great Lakes are identified as a concern in the Canada-U.S. Great Lakes Water Quality Agreement.

Phenolics (4AAP)

- the 4-amino antipyrine (4AAP) method measures total phenolics;
- tend to be ubiquitous contaminants and are thus good indicators of pollution severity;
- can be general indicators of treatment;
- can taint fish flesh at levels as low as 1 µg/L.

Oil & Grease (Solvent Extractables)

- measure of the gross hydrocarbon that could produce a visible film, sheen or discolouration on the surface of a watercourse;
- substances measured may include hydrocarbons, fatty acids, soaps, fats, oils and waxes;
- measure of groups of substances whose common characteristics is their solubility in Freon TM or hexane;
- can cause tainting of edible aquatic organisms;
- can cause odour and taste problems in drinking water;
- may form deposits on shorelines and bottom sediments;
- oil slicks prevent the full aesthetic enjoyment of water;
- can be a carrier for other toxic contaminants;
- fish and water fowl are adversely affected by oils;
- crude oil at 0.3 mg/L can be toxic to freshwater fish.

Heavy Metals Plus Arsenic

- uptake can occur in plants and animals;
- toxicity effects can be seen at low concentrations in soft waters;
- can exhibit toxicity to humans;
- sublethal effects have been documented.

XIII PARAMETER/FREQUENCY ASSIGNMENT - SPECIFIC COMMENTS

The following parameters are to be run on all quarterly samples taken from all effluent sampling points:

(1) (see Ontario Regulation 358/88 - Schedule 1)
All parameters in Analytical Test Groups 16, 17, 18, 19, 20, 23 and 24.

(2) (see Ontario Regulation 358/88 - Schedule 1)
Analytical Test Groups 28a and 28b
An open characterization for organics that lie outside of the Analytical Test Groups in (1) above with limits of quantification set at 1 part per billion (ppb) relative to the internal standard specified in Schedule 3, Part C of the General Effluent Monitoring Regulation. Any compound at or above this value must be identified and quantified.

(3) (see Ontario Regulation 358/88 - Schedule 1)
All parameters in Analytical Test Groups 1 to 12 inclusive, 14, 25 and 27.

(4) (see Ontario Regulation 358/88 - Schedule 1)
All parameters in Analytical Test Group 29. The limit of quantification for all parameters in Analytical Test Group 29 is set at 50 ppb.

(5) Toxicity Tests:
1 Fish Toxicity Test
1 Daphnia magna Acute Lethality Test

(6) PCBs
(see Ontario Regulation 358/88 - Schedule 1 - Analytical Test Group 27)
This applies only to those plants that use PCBs in electrical equipment or store PCBs.

(7) Dioxins
One analysis for dioxins (see Ontario Regulation 358/88 - Schedule 1 - Analytical Test Group 24) must be carried out during the life of the monitoring regulation. If this was done at a particular sampling point during the effluent pre-characterization study, it need not be repeated.

The frequency assignment of conventional parameters is given for all six subgroups in Schodule A of the General Effluent Monitoring Regulation.

XIV VARIABILITY OF GROUP "A" EFFLUENT FLOWS AND CHEMISTRY

Tailings areas vary in size from a few hectares to hundreds of hectares. As a result, wastes are retained within these areas for varying lengths of time. Since the surface area and average depth of a tailings area can be determined at any time and since the volume of wastes being discharged to an area is known along with other factors such as the volume of precipitation that the area is receiving, a calculated retention time can be determined for an area. In general, most tailings areas in Ontario have calculated retention times in excess of 30 days. Calculated retention times of several months are common and a few tailings areas have calculated retention times measured in years.

The Ontario Mineral Industry: Group "A" Effluent Monitoring Regulation is based on "calculated retention times" instead of "actual" retention times. "Actual" retention times for most tailings areas are difficult to determine. With such long retention times existing, dyes or chemicals that might be added to a tailings area influent to determine an "actual" retention time tend to degrade within the area itself and may not give consistent or reliable results. Because of the large number of chemical and physical processes that go on in a tailings area, significant amounts of radioactive tracers would have to be added to a non-radioactive tailings area influent in an attempt to achieve the same goal. The addition of radioactive materials to a non-radioactive tailings area on a recurring basis in an attempt to determine an "actual" retention time is not warranted.

Retention times are a function of both the size and method of operation of a tailings area. It is possible for a large tailings area to have a short calculated retention time and vice versa.

Since a tailings area normally provides a long retention period for any wastes being fed to it, mixing of wastes is enhanced and decant chemistry tends to remain stable over long periods of time. Wastes held for extended periods within a tailings area are subject to a number of physical, biological and chemical processes that act to reduce the impact of the waste on the environment and, in some cases, retention within a tailings area over a period of time has been sufficient to meet current regulatory

requirements. Monthly and more particularly seasonal variations in tailings area effluent chemistry have been noted. These are largely due to the seasonal variations in the amounts of sunlight received, the differences in temperatures and the rates and type of precipitation received at any particular site since plant operations tend to be stable. Variations in effluent quality on a daily basis are generally insignificant. As a result, daily samples are not being required in the Effluent Monitoring Regulation. In addition, because of the low variability of the chemistry in tailings area decants, representative grab samples are optional when taking samples on a thrice weekly or monthly basis provided that the tailings area in question provides at least 30 days calculated retention time for wastes.

Minewater does vary in quality and quantity from one mine to another but, at any individual mine, minewater quantity and quality tends to remain stable over long periods of time. In some cases, minewater is pumped continuously from the mine workings but, in most cases, mine pumps cycle on and off on a more or less regular basis. Mine workings can extend for more than one hundred kilometres underground and minewater from these vast areas flows slowly into common underground sumps from which it is pumped to the surface. Natural precipitation on surface will only slowly make its way into mine workings in most cases. Weeks, months or years may be required for this to happen. Also, mining methods being used at any particular mine will change only slowly. As a result of all of the foregoing, minewater tends to be only slowly variable in quantity and quality. Because of this limited variability, the Sector Effluent Monitoring Regulation permits grab samples to be taken when thrice weekly or monthly samples are being collected provided that the minewater has been retained for at least 5 days.

Grab samples are also optional on smelter/refinery effluents for samples that are required on a thrice weekly or monthly basis provided that the waste has been subjected to 5 days retention. Again, the general lack of variability of effluent chemistry on a daily basis is the reason for this action. It should be kept in mind that most Group "A" smelters and refineries discharge their wastes to tailings areas and do not discharge their wastes directly to the environment.

Grab samples are permitted on all samples taken of storm water effluent. For the most part, storm water effluents covered by the Sector Effluent Monitoring Regulation are generated as the result of runoff from inactive mining sites. Hundreds of hectares of land are normally involved. Since effluents tend to be continuous, sampling will routinely be carried out on a monthly basis. However, during periods of hot or dry weather in the summer and periods of extremely cold weather in the winter, effluent volumes may be diminished or absent. Since adequate effluent volumes cannot be guaranteed for composite sampling at all times and since the chemistry of the runoff tends to be stable for long periods of time, grab samples are permitted. Minor storm events do not have much impact on an inactive tailings area since the tailings surface tends to absorb the precipitation resulting from most routine events. This precipitation is released slowly and forms, in part, the continuous effluent from the area.

Since most Group "A" plants have been set up in a manner that directs effluents to common treatment sites, "storm water effluents" originating at parking lots or facilities such as concentrate loading areas are rare. When they do exist, they are subject to all of the provisions of the General Effluent Monitoring Regulation that apply to "storm water effluents".

XV SUMMARY: TYPE OF SAMPLES PERMITTED

Grab samples are permitted as follows providing that the effluent, prior to sampling, has been retained for at least the prescribed calculated period of time:

Effluent Type	Required Calculated Retention Time
Process Effluent	30 days
Minewater Effluent	5 days
Smelter/Refinery Effluent	5 days
Storm Water Effluent	0 days

The above grab samples are permitted only for samples that are being taken on a thrice weekly or monthly basis. Composite samples are required in all other cases and for all samples being taken on a quarterly basis. One exception to this rule is storm water effluent. Grab samples are permitted for all types of storm water samples.

XVI ROUTINE MONITORING AND CHARACTERIZATION

Routine monitoring for the Ontario Mineral Industry Sector: Group "A" consists of a number of conventional parameters that are standard to the industry (on Provincial and Federal levels). These parameters are run on a thrice weekly or monthly basis. Characterization (also referred to as "closed characterization") is run on a quarterly basis and consists of the complete EMPPL with the few exceptions outlined in Part II, Section VIII.

From the statistical data shown in Table 1, it is clear that for a given parameter that is present 50% of the time or greater in an effluent, the probability of finding the contaminant is very high and virtually the same whether eleven samples (99.9% probability) or four samples (93.7% probability) are taken.

For a given parameter that is present infrequently such as 2% of the time, characterizing eleven samples provides only a 19.9% chance of detecting the parameter. Nine samples would provide only a slightly reduced probability of 16.6%. However, this should be considered in the context that a parameter appearing only 2% of the time is less likely to cause a major environmental impact than one appearing 50% of the time. The biggest unknown in attempting to determine the appropriate characterization frequency is the a priori probability of a parameter's presence in an effluent.

By dividing Group"A" into six subgroups that shared similarities, by recognizing the lack of Group "A"'s flow and parameter variability, by recognizing the fact that the generic approach in monitoring that has been taken on a subsector level will lead to a large amount of data that is common to a subsector and can be shared by a subsector, the costs of characterization were reduced without a significant sacrifice in technical data.

Because of the costs associated with the analysis of PCBs and dioxins, PCBs are to be run quarterly only at those plants that use or store PCBs. Because there is no reason to suspect that dioxins would be present in any Group "A" plant effluent, dioxins will only be run once at Group "A" plants. If dioxin has already been run at a Group "A" plant during the pre-characterization program, it need not be repeated.

TABLE 1 - PROBABILITY OF DETECTING AT LEAST ONE SAMPLE ABOVE THE DETECTION LIMIT

SINGLE SAMPLE PROBABILITY OF		NUMBER OF SAMPLES								RATIO OF DETECT/ (DETECT + NON-DETECT) (D/D+ND)
DETECT (P)	NON-DETECT (Q)	12	11	10	9	8	6	4	2	
0.5	0.5	0.999	0.999	0.999	0.998	0.996	0.984	0.937	0.750	1/2
0.4	0.6	0.998	0.996	0.994	0.990	0.983	0.953	0.870	0.640	2/5
0.3	0.7	0.986	0.980	0.972	0.960	0.942	0.882	0.759	0.510	3/10
0.2	0.8	0.931	0.914	0.893	0.866	0.832	0.738	0.590	0.360	1/5
0.1	0.9	0.717	0.686	0.651	0.613	0.569	0.468	0.344	0.190	1/10
0.05	0.95	0.460	0.431	0.401	0.370	0.337	0.265	0.185	0.098	1/20
0.02	0.98	0.215	0.199	0.183	0.166	0.149	0.114	0.078	0.040	1/50
0.01	0.99	0.113	0.105	0.095	0.086	0.077	0.058	0.039	0.019	1/100

This table shows the probability of a sample with a parameter above MDL for the number of samples tested.

XVII OPEN CHARACTERIZATION

It is the intention of the Ministry to identify as many compounds as possible that can be extracted (or purged) from samples taken on a quarterly basis. Termed "open characterization", a target limit of quantification for this work has been set as close to 1 ppb as possible on a sample to sample basis.

Open characterization will provide tentative identification of both organic compounds and elements that are currently not on EMPPL. Use is made of gas chromatography/mass spectrometry (GC/MS) and inductively coupled plasma procedures or atomic emission spectroscopy to obtain the data.

Open characterization will be used to provide candidate compounds for hazard assessment for potential addition to the EMPPL. In this way, open characterization when combined with characterization data will provide a more relevant parameter list for future monitoring and control. The 1987 EMPPL does not cover all of the compounds that could be discharged from the Group "A" plants because of the current lack of valid monitoring data to indicate the presence of compounds.

The relatively modest incremental cost of running open characterization in conjunction with characterization analysis and large pay back in data produced is a strong justification for coupling open scans with Group "A" characterization requirements.

The detection limit achievable for open characterization of organic compounds will depend upon the sample size, concentration factor, efficiency of extraction from the original matrix, GC/MS conditions, overall complexity of the sample, degree of chromatographic resolution from other co-extractives and the mass spectral characteristics of specific compounds. In some cases, compounds extracted from a 1.0 L sample may be identifiable at concentrations as low as 1 - 5 parts per billion (ppb). In other cases, identification may require concentrations of components to be 50 ppb or greater. In the majority of the cases, 10 - 20 ppb concentrations should be detectable.

The protocols and procedures for analysis of the samples for open characterization will be published in a document produced by the Ministry's Laboratory Services Branch. This document will be available prior to this regulation coming into force. Chemical Abstract Service (CAS) numbers should be provided for all compounds identified under open characterization.

In addition, Analytical Test Group 29 outlines the parameters that constitute an open characterization for elements. Required limits of quantification here are 50 ppb.

The Ontario Mineral Industry Sector: Group "A" will perform open characterizations for organics and elements on all effluents on a quarterly basis. ("Quarterly" means on the same sample taken for quarterly characterization.)

XVIII TOXICITY TESTING

Toxicity testing requirements for Group "A" consist of both the fish toxicity test (Rainbow Trout Acute Lethality Test) and the Daphnia magna Acute Lethality Test as outlined in the published protocols entitled:

- "Protocol to Determine the Acute Lethality of Liquid Effluents to Fish";
- "Daphnia magna Acute Lethality Toxicity Test Protocol".

Both tests are to be run quarterly on all Group "A" effluents.

Since it is essential to protect all forms of aquatic life, it is critical that the impact of various effluents be assessed on as many different types of aquatic organisms as is practical.

The Ministry has reviewed both Daphnia magna and rainbow trout test results on the same samples and concluded that Daphnia magna and trout differ in their sensitivity to some effluents and thus the addition of the Daphnia magna test will provide valuable additional information.

pH Adjustment

pH adjustment will not be allowed on samples collected for the Group "A" Regulation for the following reasons:

- the Ministry needs to establish the actual toxicity level of the final discharges in the from of LC50 values to assist in future toxicity limit setting. The LC50 limits to be set will be based on those limits achievable using BATEA. The toxicity data will assist in defining the limit;
- pH adjustment simulates no condition that actually occurs in the environment;
- adjustment of pH may have an impact on modifying the toxicity of other compounds in the sample.

Final discharges with pH outside the Ministry guidelines of 6.5 to 9.5 will be tested using both the rainbow trout and the Daphnia magna toxicity tests without pH adjustment. While the undiluted effluent may be predictably lethal primarily due to pH alone, the series of dilutions required under the tests will isolate the pH effect and allow the calculation of an LC50 value.

Companies may, on a voluntary basis, where the pH is outside the range of the Ministry guidelines, perform toxicity tests on pH adjusted effluents in parallel with those on unadjusted effluents. Submission of data on pH adjusted samples will be voluntary and will be used by the Ministry for comparison with the pH unadjusted sample results.

Use of Full Dilution Series vs. Full Strength (Pass/Fail) Tests

Pass/fail tests produce non-quantitative results. For some plants, it may not be possible for available technology to achieve an LC50 of 100%. Thus, doing full dilution series to determine an LC50 on an effluent will allow the option of selection a technically sound final toxicity criteria instead of using only pass/fail.

For effluent samples that are non-lethal at full strength, additional information is rarely obtained from the dilutions in a full series LC50. However, the non-lethality of the sample is never known with 100% certainty in advance of starting the test.

If a pass/fail test fails, there are only two ways of obtaining an LC50 value. First, the full series LC50 test could be performed on the same sample after the pass/fail test is complete. This would be unsatisfactory because, given that 96 hours is the minimum time necessary to provide a measure of acute lethality for trout, by the time the series dilutions were started the sample would be at least 4 - 6 days old. This is unacceptably long for a perishable sample.

Collecting a totally new sample for the LC50 series after the original sample has failed a pass/fail test is also unacceptable because it will be collected at an entirely different time.

XVIX QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) encompasses all of the procedures undertaken to ensure that data produced are generated within known probability limits of accuracy and precision.

Quality assurance is the overall verification program which provides producers and users of data the assurance that predefined standards of quality at predetermined levels of confidence are met. Quality assurance is comprised of two elements: quality control and quality assessment.

Quality control is the overall system of guidelines, procedures and practices which are designed to regulate and control the quality of products or services with regards to previously established performance criteria and standards.

Quality assessment is the overall system of activities which ensure that quality control is being performed effectively. This is carried out immediately following quality control and involves evaluation and auditing of quality control data to ensure the success of the quality control program.

QA/QC is one of the most important aspects of the MISA monitoring regulations. The QA/QC program includes many small but essential activities ranging from proving the cleanliness of sample bottles, using proper sampling equipment, containers and preservatives to instrument calibration; validation of authenticity of standards, inclusion of blanks, spikes and controls in analytical runs to documenting performance; participation in external round-robins to defining the proper method for reporting a final data number. Omission of one of these activities can lead to unreliable data resulting in improper conclusions and perhaps inappropriate actions.

The financial stakes riding on the monitoring regulation data are too high to compromise the generated date with inadequate QA/QC.

XX ECONOMIC IMPLICATIONS OF THE REGULATION

Mining is a major contributor to employment and income in Ontario's north. Nearly all of the metal mines which are subject to the MISA monitoring regulation are located on the vast Northern Canadian granite shield. The two salt mines are located in Southwestern Ontario where sedimentary rocks contain large salt deposits from prehistoric seas.

Each mining subsector serves different markets with different economic characteristics. Salt markets and the industry which supplies it are substantially different from metal markets so that the assessments of monitoring costs and their implications for the 2 salt mines were carried out separately from the metal mines. A detailed look at the Metal Mining Sector in Ontario can be found in "Industry Profile: The Metal Mining and Refining Sector in Ontario", A.R.A., 1988.

Capital and operating costs were estimated for five monitoring activities for each of the six commodity-specific subsectors and then for each mine location. Monitoring activities for which costs are estimated include sampling, flow measurement, characterization and routine analyses, toxicity testing and reporting.

Costs of characterization, routine and toxicity testing were estimated by assuming that all tests would be carried out at a commercial lab. This procedure permits the costs of analyses for each plant to be compared and aggregated. No capital expenses were associated with analysis costs.

Capital investments would be required to install flow measurement equipment at each mine site and to purchase computers and software to store and manipulate monitoring data. Additional labour would be required to maintain flow measurement equipment, to collect samples and to record data over the 12 month period of the regulation.

Maintenance of flow measurement installations was seen to be especially problematic because of weather conditions. Transportation of samples to laboratories in Toronto will be particularly costly because of the remote locations of many metal mining operations.

Estimates of flow measurement, sampling and reporting capital and operating resource requirements and costs were provided by the Ontario Mining Association. Further analyses of these costs and implications can be found in the report "Economic Implications of Ontario Mineral Industry Sector: Group A Monitoring Regulations", Policy and Planning Branch, MOE 1989.

Association representatives pointed out that some mines may contract sampling activities to consultants. Costs were estimated for one scenario in which all metal mines contracted sampling to consultants and another in which all metal mining operations conducted sampling with their own staff. Moreover, installation costs of flow measurement devices were found to range from $20,000 to $70,000 per installation depending on sites. Therefore, total capital costs for flow measurement installations could vary by 3.5 times.

Estimates of the operating and capital costs by monitoring activity are presented below.

PRELIMINARY ESTIMATES OF THE INCREMENTAL OPERATING AND CAPITAL COSTS BY MONITORING ACTIVITY
($000)

ACTIVITY	CAPITAL		OPERATING	
	Low	High	Low	High
Sampling (including transportation)	2,200	2,746	4,597	13,863
Flow measurement	1,630	5,770	29	126
Characterization and Routine analyses	-	-	5,748	5,748
Toxicity Testing	-	-	141	141
Reporting (including initial report)	870	870	3,975	3,975
TOTAL	4,700	9,386	14,490	23,853

Total incremental operating and capital costs for the entire Group "A" sector range from $19 to $33 million.

If all Group "A" mines had to monitor for a common list of contaminants, as petroleum sector refineries must, total cost of routine monitoring for the Group "A" sector would be $7.6 million as opposed to $4.6 million under the proposed requirements. This represents a cost savings of $3.0 million and is a measure of the cost effectiveness of the subsector and stream specific approach proposed for the Group "A" sector.

The two salt mining companies have been consistently profitable over the past 5-6 years and the estimated incremental monitoring costs do not appear to be a potential burden to these firms.

In the aggregate, operating costs for all 22 companies for which financial data are available would account for between 29% and 1.4% of total after-tax profits for these firms.

Capital costs for monitoring would account for between 1.5% and 0.3% of total capital investments for these 22 companies.

Operating costs would appear to impose a substantial burden on only two out of 22 "metal" mining companies if one looks at the most recent years' profits. During the early 1980's when metal markets were in a severe recession, monitoring costs would have accounted for more than 50% of after-tax profits for seven of the 22 mining companies.

Those firms whose monitoring costs estimates constitute a large portion of after-tax profits all appear to have sufficient cash resources to incur these costs over the 12-month period. The companies concerned will be examined more closely to assess their financial capabilities for additional environment requirements.

XXI REFERENCES

(1) U.S. Environmental Protection Agency, "Development Document for the Effluent Limitations and Guidelines for the Ore Mining and Dressing Point Source Category. Volumes I and II", Washington D.C., July 1978.

(2) Ontario Ministry of the Environment, "1986 Report on the Industrial Direct Discharges in Ontario", October 1987.

(3) Ontario Ministry of the Environment, "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment", November 1978 (Revised May 1984).

(4) Ontario Ministry of the Environment, "Protocol to Determine the Acute Lethality of Liquid Effluents to Fish", July 1983.

(5) Ontario Ministry of the Environment, "Daphnia magna Acute Lethality Toxicity Test", April 1988.

(6) Ontario Ministry of the Environment, "The Effluent Monitoring Priority Pollutants List (1987)", July 1988.

(7) Ontario Ministry of the Environment, "The Problem of Acid Mine Drainage in the Province of Ontario", 1977.

(8) Ontario Ministry of the Environment, "The Chemical Characteristics of Mineral Tailings in the Province of Ontario", 1979.

(9) Ontario Ministry of the Environment, "Mine Waste Control", 1977.

(10) Ontario Ministry of the Environment, "The Physical, Chemical and Radiological Characteristics of the Surface Layers of Ontario Uranium Tailings Deposits", 1982.

(11) Ontario Ministry of the Environment, "The Use, Characteristics and Toxicity of Mine-Mill Reagents in the Province of Ontario", 1977.

(12) Ontario Ministry of the Environment, "Levels of Metals and Non-Metals in Vegetation Growing on Deposits of Mineral Tailings in the Province of Ontario", 1984.

(13) Ontario Ministry of the Environment, "Rationale for the Establishment of Ontario's Provincial Water Quality Objectives", 1979.

PART III

REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - ONTARIO MINERAL INDUSTRY SECTOR:

GROUP A

PART III - REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

DEFINITIONS

1.-(1) In this Regulation,

"calculated retention time" means the period of time in days that results by dividing the daily effluent flow into the total available volume of the retention basin from which the effluent is being discharged;

"composite sample" means a volume of effluent made up of three or more sub-samples that have been combined automatically or manually or obtained from a slip stream to an on-line analyzer and includes three grab samples, taken over a period of eight hours, combined manually, provided that the time interval between consecutive grab samples is not less than two hours;

"exploration or development property" means an Ontario Mineral Industry in Group A at which,

(a) a mineral product is not being commercially recovered,

(b) the purpose of activities at the property is to explore a geological structure, to determine potential ore reserves, or to prepare a geological structure for commercial production,

(c) the total effluent volume being discharged is more than 50,000 litres per day averaged over any 30 consecutive operating days, and

(d) that is identified in Schedule B by the notation (EXP/DEV);

"General Effluent Monitoring Regulation" means Ontario Regulation 695/88;

"grab sample" means a volume of effluent of at least 100 millilitres which is collected over a period not exceeding 1 hour and immediately transferred to the appropriate laboratory sample container set out in Column 2 of Schedule 2 of the General Effluent Monitoring Regulation;

"Group A" means plants in the "Ontario Mineral Industry" that fall into the following sub-sectors:

(a) Copper, Lead, Zinc, Nickel,

(b) Gold,

(c) Iron,

(d) Salt (sodium chloride),

(e) Silver, or

(f) Uranium;

"minewater effluent" means any effluent from any mine, pit or quarry;

"minewater effluent sampling point" means a point in a minewater effluent stream situated,

(a) before the place of discharge to a surface watercourse,

(b) after final treatment, and

(c) upstream of any significant contaminant masking or significant dilution by any other effluent;

"minewater effluent stream" means minewater effluent which flows through an open or closed channel;

"Ontario Mineral Industry" means plants involved in the mining or processing of natural deposits of minerals or rocks and includes mines, pits and quarries and associated industrial operations, namely, storage, transportation, comminution, beneficiation, smelting and refining;

"process effluent" means any effluent from an active tailings area or treatment facilities associated with an active tailings area;

"smelter/refinery" means a smelter or a refinery or both;

"smelter/refinery effluent" means any effluent from any smelter/refinery;

"smelter/refinery effluent sampling point" means a point in a smelter/refinery effluent stream situated,

(a) before the place of discharge to a surface watercourse,

(b) after final treatment, and

(c) upstream of any significant contaminant masking or significant dilution by any other effluent;

"storm water effluent" means any effluent from an inactive tailings area or treatment facilities associated with an inactive tailings area collected prior to being discharged to a surface watercourse and includes any effluent from paved or unpaved areas at a plant such as parking lots and chemical or waste storage areas collected prior to being discharged to a surface watercourse;

"sub-sector" means a plant or a group of plants listed in Schedule B that produce as a main product,

(a) Copper, Lead, Zinc, or Nickel,

(b) Gold,

(c) Iron,

(d) Salt (sodium chloride),

(e) Silver, or

(f) Uranium;

"tailings area" means a limited disposal area for finely divided solid waste materials that are produced during the milling of an ore and is confined by manmade or natural structures or both;

(2) The definitions in Section 1 of the General Effluent Monitoring Regulation apply to this Regulation.

PURPOSE

2. The purpose of this Regulation is to establish a data base on effluent quality in the Ontario Mineral Industry Sector: Group "A" that, along with other pertinent information, will be used for the development of effluents limits for the Ontario Mineral Industry Sector: Group "A".

APPLICATION

3.-(1) This Regulation applies only with respect to the plants listed in Schedule B.

(2) Despite subsection (1), sections 4, 5, 6, 7, 8, 9, 10, 11 and 12 of this Regulation do not apply to an exploration or development property.

(3) This Regulation is a Sectoral Effluent Monitoring Regulation within the meaning of the General Effluent Monitoring Regulation and in the event of a conflict, this Regulation prevails.

(4) Each direct discharger shall carry out the monitoring obligations, including the sampling, analysis, toxicity testing, flow measurement, recording and reporting obligations, of this Regulation in accordance with the General Effluent Monitoring Regulation.

(5) An obligation on a person to do a thing under this Regulation is discharged if another person has done it.

(6) Any owner of a plant listed in Schedule B with a name different than the name used in Schedule B shall notify the Director in writing of its legal and other names within thirty days after the filing of this Regulation and within thirty days after any change of owner or operator or its name.

(7) A plant listed in Schedule B that is not discharging an effluent is exempt from the requirements of this Regulation which pertain to that effluent during the period in which that effluent is not being discharged.

SAMPLING POINTS

4.-(1) Each discharger shall establish the following sampling points:

1. A minewater effluent sampling point on each minewater effluent stream.

2. A smelter/refinery effluent sampling point on each smelter/refinery effluent stream.

3. A process effluent sampling point on each process effluent stream.

4. A storm water effluent sampling point on each storm water effluent stream.

(2) The sampling points established under subsection (1) shall be used for all sampling required by this Regulation except that a direct discharger may use alternate sampling points where that is acceptable to the Director.

ROUTINE MONITORING

THRICE WEEKLY MONITORING

5.-(1) On at least three separate operating days in each week, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (3) from each sampling point of that discharger.

(2) The time interval between consecutive daily samples referred to in subsection (1) must not be less than 12 hours.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters in the columns marked "3W" in Schedule A.

MONTHLY MONITORING

6.-(1) On at least one operating day in each month, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (3) from each sampling point of that discharger.

(2) The time interval between consecutive monthly samples referred to in subsection (1) must not be less than 15 days.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters in the columns marked "M" in Schedule A.

CHARACTERIZATION

QUARTERLY MONITORING

7.-(1) On at least one operating day in each three-month period, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (3) from each sampling point of that discharger.

(2) The time interval between consecutive quarterly samples referred to in subsection (1) must not be less than 45 days.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters in the columns marked "Q" in Schedule A.

STORM WATER MONITORING

8.-(1) During a discharge of storm water and at a frequency not greater than once per month, each direct discharger shall collect a set of samples representative of that discharge and sufficient to perform all of the analyses required by subsection (4) from each storm water sampling point on each affected storm water effluent stream of that discharger.

(2) When a storm water effluent is being discharged on a continuous basis, each direct discharger shall collect a set of samples on at least one day in each month of that discharge and sufficient to perform all of the analyses required by subsection (4).

(3) The time interval between consecutive monthly samples referred to in subsection (2) must not be less than 15 days.

(4) Each direct discharger shall analyze each set of samples collected under subsections (1) or (2) or both for the parameters in the columns marked "at time of discharge" in Schedule A.

QUALITY CONTROL MONITORING

9.-(1) For the purposes of this section, "quality control samples" means,

(a) one travelling blank sample for each sample collected under section 7 for analysis for parameters in each analytical test group in Column 2 of Schedule A, except groups 1, 3 and 8; and

(b) one travelling spiked blank sample for each sample collected under section 7 for analysis for parameters in analytical test groups 16 to 21 in Column 2 of Schedule A.

(2) Each direct discharger shall prepare each travelling spiked blank sample required to be analyzed by this section with a standard solution containing at least the parameters to be analyzed for.

(3) Each direct discharger shall collect quality control samples from each sampling point of that discharger once in each quarter concurrent with the sampling required by section 7 and shall analyze the samples for the parameters in the columns marked "Q" in Schedule A.

TOXICITY TESTING

10.-(1) On at least one operating day in each three month period, each direct discharger shall collect a sample from each sampling point and shall perform a fish toxicity test on each sample.

(2) On at least one operating day in each three month period, each direct discharger shall collect a sample from each sampling point and shall perform a Daphnia magna Acute Lethality Test on each sample.

(3) The samples required by subsection (1) and subsection (2) shall be taken at the same time and shall be collected together in the same container or set of containers.

(4) The time interval between consecutive quarterly samples referred to in subsections (1) and (2) must not be less than 45 days.

(5) Where feasible, the samples referred to in subsections (1) and (2) shall be collected at the same time as the samples referred to in subsection 7(1).

FLOW MEASUREMENT

11.-(1) Each direct discharger shall measure or estimate the flow of each effluent stream at the time of sampling and at a location or set of locations representative of the flow at the sampling point established for that stream and shall record the measured or estimated flow.

(2) Where the flow of a process effluent stream, minewater effluent steam, smelter/refinery effluent stream or storm water effluent stream is measured and cannot be measured on any day because of equipment malfunction and all reasonable care has been taken to avoid and correct the malfunction, the effects of freezing or inclement weather, the direct discharger may fulfill the obligations of subsection (1) by estimating the total daily flow of that stream and recording the estimate.

(3) Methods, devices or calculations for the measurement or estimation of flow shall be capable of accuracy to within plus or minus 20 per cent of actual flow.

(4) All flow measuring devices shall be installed, maintained and calibrated according to the recommendations of the manufacturer.

TYPES OF SAMPLES PERMITTED

12.-(1) Grab samples may be taken from process effluent sampling points for the purposes of analyses that are required on a three times per week or monthly basis provided that the process effluent sampling points have been subjected to 30 days or more calculated retention time before the samples are taken.

(2) Grab samples may be taken from minewater effluent sampling points for the purposes of analyses which are required on a three times weekly or monthly basis provided that the minewater effluent sampling points have been subjected to 5 days or more calculated retention time before the samples are taken.

(3) Grab samples may be taken from storm water effluent sampling points for the purposes of analyses which are required on a monthly basis, on a quarterly basis or "at time of discharge".

(4) Grab samples may be taken from smelter/refinery effluent sampling points for the purposes of analyses that are required on a three times weekly or monthly basis provided that the smelter/refinery effluent sampling points have been subjected to 5 days or more calculated retention time before the samples are taken.

(5) Except for subsection (3) each direct discharger shall collect composite samples for the purposes of analyses that are required on a quarterly basis.

(6) Each direct discharger shall collect composite samples where the prescribed retention times under subsections (1), (2) and (4) have not been satisfied.

REPORTING

13.-(1) Within seven days after this section comes into force, each direct discharger shall submit an initial report to the Director in respect of that direct discharger's plant.

(2) Each direct discharger shall report any significant changes to the information submitted under subsection (1) to the Director within 60 days after the end of the month during which the change occurs.

(3) Each direct discharger shall report to the Director the results of all analyses performed by or on behalf of the direct discharger under sections (5) to (9) of this Regulation and under subsection 4(12) of the General Regulation, including all positive numerical values at or above the analytical method detection limits calculated by the laboratory performing the analysis.

(4) The results of all analyses and flow measurement information required to be reported to the Director shall be reported in writing signed by the direct discharger and on a floppy diskette in an electronic format acceptable to the Director or in an equivalent electronic format acceptable to the Director,

(a) within 60 days after the last day of the week on which samples were collected on a three times per week basis;

(b) within 90 days after the day on which samples were collected on a monthly basis;

(c) within 90 days after the day on which samples were collected on a quarterly basis.

(5) The results of all analyses and flow measurement information currently required by an exploration or development property to be reported to the Director shall be reported in writing signed by the direct discharger and on a floppy diskette in an electronic format acceptable to the Director or in an equivalent electronic format acceptable to the Director within 60 days after the last day of the week on which samples were collected.

(6) Each direct discharger shall report all flows in cubic metres per day.

(7) Each direct discharger shall report the "calculated retention time" and the method of calculation of the "calculated retention time" for all process effluents, minewater effluents and smelter/refinery effluents from which grab samples are to be taken.

(8) Each direct discharger shall report to the Director the date and duration of each storm event, the amount of rainfall during that event and the date, duration and approximate volume of each discharge of storm water to a surface watercourse for which a set of samples is collected under subsection 8(1).

(9) Except for samples collected under subsection 8(1), at least 30 days before the first day of each month, each direct discharger shall submit to the Director a schedule of sampling dates and times by location for all monthly and quarterly sampling in that month.

(10) Each direct discharger shall keep records of all sampling required by this Regulation, including, for each sample, the date and time of collection, sampling procedures used, the amount of sample dilution by preservative if dilution exceeds one per cent, and any incident likely to affect an analytical result.

(11) Each direct discharger shall develop a maintenance and calibration schedule for all sampling equipment and shall record the results of all maintenance and calibration performed.

(12) Records of all analytical methods used shall be kept by the direct discharger.

(13) Each direct discharger shall submit a report to the Director detailing the date, duration and cause of each sampling, toxicity testing, analytical and flow measurement malfunction or other problem which interferes with the requirements under this Regulation, and remedial action taken, within thirty days after the end of the month in which the malfunction or problem occurs.

(14) All records and reports required to be kept or made by this Regulation shall be retained by the direct discharger for a period of two years beyond the last report of any analytical data submitted as required by this Regulation.

(15) When subsection 14(3) comes into force, the results of all analyses and flow measurement information required by Ministry of the Environment Certificates of Approval for plants listed in Schedule B that are in force shall be reported in writing signed by the direct discharger and on a floppy diskette in an electronic format acceptable to the Director or in an equivalent electronic format acceptable to the Director within 90 days after the day on which the samples were collected.

TIMING

14.-(1)This Regulation, except subsection 13(1), comes into force on the first day of the fifth month following filing.

(2) Subsection 13(1) comes into force on the first day of the third month following filing.

(3) Sections 5, 6, 7, 8, 9, 10, 11 and subsections 13(4), 13(8) and 13(9) are revoked one year after the day this Regulation comes into force.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
2	Total cyanide	Total cyanide	X**		XXX	X**		XXX			XXX		XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX			XXX		XXX
5b		Total organic carbon (TOC)			XXX			XXX			XXX		XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX			XXX		XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Volatile suspended solids (VSS)											
9	Total metals	Aluminum			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Cadmium		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Chromium			XXX			XXX			XXX		XXX
		Cobalt		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Copper	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Lead	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX			XXX		XXX
		Nickel	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Silver			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Zinc	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
10	Hydrides	Antimony			XXX			XXX			XXX		XXX
		Arsenic	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Selenium			XXX			XXX			XXX		XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX			XXX		XXX
12	Mercury	Mercury		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX			XXX		XXX
		1,1,2-Trichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethylene			XXX			XXX			XXX		XXX
		1,2-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX			XXX		XXX
		1,2-Dichloropropane			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,4-Dichlorobenzene			XXX			XXX			XXX		XXX
		Bromoform			XXX			XXX			XXX		XXX
		Bromomethane			XXX			XXX			XXX		XXX
		Carbon tetrachloride			XXX			XXX			XXX		XXX
		Chlorobenzene			XXX			XXX			XXX		XXX
		Chloroform			XXX			XXX			XXX		XXX
		Chloromethane			XXX			XXX			XXX		XXX
		Cis-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Dibromochloromethane			XXX			XXX			XXX		XXX
		Ethylene dibromide			XXX			XXX			XXX		XXX
		Methylene chloride			XXX			XXX			XXX		XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX			XXX		XXX
		Trans-1,2-Dichloroethylene			XXX			XXX			XXX		XXX
		Trans-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Trichloroethylene			XXX			XXX			XXX		XXX
		Trichlorofluoromethane			XXX			XXX			XXX		XXX
		Vinyl chloride (Chloroethylene)			XXX			XXX			XXX		XXX
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX			XXX		XXX
		Styrene			XXX			XXX			XXX		XXX
		Toluene			XXX			XXX			XXX		XXX
		o-Xylene			XXX			XXX			XXX		XXX
		m-Xylene and p-Xylene			XXX			XXX			XXX		XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX			XXX		XXX
		Acrylonitrile			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX			XXX		XXX
		5-nitro Acenaphthene			XXX			XXX			XXX		XXX
		Acenaphthylene			XXX			XXX			XXX		XXX
		Anthracene			XXX			XXX			XXX		XXX
		Benz(a)anthracene			XXX			XXX			XXX		XXX
		Benzo(a)pyrene			XXX			XXX			XXX		XXX
		Benzo(b)fluoranthene			XXX			XXX			XXX		XXX
		Benzo(g,h,i)perylene			XXX			XXX			XXX		XXX
		Benzo(k)fluoranthene			XXX			XXX			XXX		XXX
		Biphenyl			XXX			XXX			XXX		XXX
		Camphene			XXX			XXX			XXX		XXX
		1-Chloronaphthalene			XXX			XXX			XXX		XXX
		2-Chloronaphthalene			XXX			XXX			XXX		XXX
		Chrysene			XXX			XXX			XXX		XXX
		Dibenz(a,h)anthracene			XXX			XXX			XXX		XXX
		Fluoranthene			XXX			XXX			XXX		XXX
		Fluorene			XXX			XXX			XXX		XXX
		Indeno(1,2,3-cd)pyrene			XXX			XXX			XXX		XXX
		Indole			XXX			XXX			XXX		XXX
		1-Methylnaphthalene			XXX			XXX			XXX		XXX
		2-Methylnaphthalene			XXX			XXX			XXX		XXX
		Naphthalene			XXX			XXX			XXX		XXX
		Perylene			XXX			XXX			XXX		XXX
		Phenanthrene			XXX			XXX			XXX		XXX
		Pyrene			XXX			XXX			XXX		XXX
		Benzyl butyl phthalate			XXX			XXX			XXX		XXX
		Bis(2-Ethylhexyl) phthalate			XXX			XXX			XXX		XXX
		Di-n-butyl phthalate											

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether			XXX			XXX			XXX		XXX
		4-Chlorophenyl phenyl ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroisopropyl)ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroethyl)ether			XXX			XXX			XXX		XXX
		Diphenyl ether			XXX			XXX			XXX		XXX
					XXX			XXX			XXX		XXX
		2,4-Dinitrotoluene			XXX			XXX			XXX		XXX
		2,6-Dinitrotoluene			XXX			XXX			XXX		XXX
		Bis(2-Chloroethoxy)methane			XXX			XXX			XXX		XXX
		Diphenylamine			XXX			XXX			XXX		XXX
		N-Nitrosodiphenylamine			XXX			XXX			XXX		
		N-Nitrosodi-n-propylamine											XXX
20	Extractables, Acid (Phenolics)				XXX			XXX			XXX		XXX
		2,3,4,5-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,5,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4-Trichlorophenol			XXX			XXX			XXX		XXX
		2,3,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,6-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4-Dimethyl phenol			XXX			XXX			XXX		XXX
		2,4-Dinitrophenol			XXX			XXX			XXX		XXX
		2,4-Dichlorophenol			XXX			XXX			XXX		XXX
		2,6-Dichlorophenol			XXX			XXX			XXX		XXX
		4,6-Dinitro-o-cresol			XXX			XXX			XXX		XXX
		2-Chlorophenol			XXX			XXX			XXX		XXX
		4-Chloro-3-methylphenol			XXX			XXX			XXX		XXX
		4-Nitrophenol											

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
20	Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX			XXX		XXX
		o-Cresol			XXX			XXX			XXX		XXX
		p-Cresol			XXX			XXX			XXX		XXX
		Pentachlorophenol			XXX			XXX			XXX		XXX
		Phenol			XXX			XXX			XXX		XXX
21	Extractables, Phenoxy Acid Herbicides												
22	Extractables, Organochlorine Pesticides												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,4,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3-Trichlorobenzene			XXX			XXX			XXX		XXX
		1,2,4-Trichlorobenzene			XXX			XXX			XXX		XXX
		2,4,5-Trichlorotoluene			XXX			XXX			XXX		XXX
		Hexachlorobenzene			XXX			XXX			XXX		XXX
		Hexachlorobutadiene			XXX			XXX			XXX		XXX
		Hexachlorocyclopentadiene			XXX			XXX			XXX		XXX
		Hexachloroethane			XXX			XXX			XXX		XXX
		Octachlorostyrene			XXX			XXX			XXX		XXX
		Pentachlorobenzene			XXX			XXX			XXX		XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ***	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzofuran			XXX			XXX			XXX		XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q**
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans *** (continued)	Total heptachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzofurans			XXX			XXX			XXX		XXX
25	Solvent Extractables	Oil and grease	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
26	Fatty and Resin Acids												
27	Polychlorinated Biphenyls ***	PCBs (Total)			XXX			XXX			XXX		XXX
28a	Open Characterization - Volatiles				XXX			XXX			XXX		XXX
28b	Open Characterization - Extractables				XXX			XXX			XXX		XXX
29	Open Characterization - Elemental	Aluminum			XXX			XXX			XXX		XXX
		Antimony			XXX			XXX			XXX		XXX
		Arsenic			XXX			XXX			XXX		XXX
		Barium			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Bismuth			XXX			XXX			XXX		XXX
		Boron			XXX			XXX			XXX		XXX
		Cadmium			XXX			XXX			XXX		XXX
		Calcium			XXX			XXX			XXX		XXX

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

	STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
	FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
29 Open Characterization - Elemental (continued)	Cerium			XXX			XXX			XXX		XXX
	Cesium			XXX			XXX			XXX		XXX
	Chromium			XXX			XXX			XXX		XXX
	Cobalt			XXX			XXX			XXX		XXX
	Copper			XXX			XXX			XXX		XXX
	Dysprosium			XXX			XXX			XXX		XXX
	Erbium			XXX			XXX			XXX		XXX
	Europium			XXX			XXX			XXX		XXX
	Gadolinium			XXX			XXX			XXX		XXX
	Gallium			XXX			XXX			XXX		XXX
	Germanium			XXX			XXX			XXX		XXX
	Gold			XXX			XXX			XXX		XXX
	Hafnium			XXX			XXX			XXX		XXX
	Holmium			XXX			XXX			XXX		XXX
	Indium			XXX			XXX			XXX		XXX
	Iridium			XXX			XXX			XXX		XXX
	Iron			XXX			XXX			XXX		XXX
	Lanthanum			XXX			XXX			XXX		XXX
	Lead			XXX			XXX			XXX		XXX
	Lithium			XXX			XXX			XXX		XXX
	Lutetium			XXX			XXX			XXX		XXX
	Magnesium			XXX			XXX			XXX		XXX
	Manganese			XXX			XXX			XXX		XXX
	Mercury			XXX			XXX			XXX		XXX
	Molybdenum			XXX			XXX			XXX		XXX
	Neodymium			XXX			XXX			XXX		XXX
	Nickel			XXX			XXX			XXX		XXX
	Niobium			XXX			XXX			XXX		XXX
	Osmium			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX			XXX		XXX
		Phosphorus			XXX			XXX			XXX		XXX
		Platinum			XXX			XXX			XXX		XXX
		Potassium			XXX			XXX			XXX		XXX
		Praesodymium			XXX			XXX			XXX		XXX
		Rhenium			XXX			XXX			XXX		XXX
		Rhodium			XXX			XXX			XXX		XXX
		Rubidium			XXX			XXX			XXX		XXX
		Ruthenium			XXX			XXX			XXX		XXX
		Samarium			XXX			XXX			XXX		XXX
		Scandium			XXX			XXX			XXX		XXX
		Selenium			XXX			XXX			XXX		XXX
		Silicon			XXX			XXX			XXX		XXX
		Silver			XXX			XXX			XXX		XXX
		Sodium			XXX			XXX			XXX		XXX
		Strontium			XXX			XXX			XXX		XXX
		Sulfur			XXX			XXX			XXX		XXX
		Tantalum			XXX			XXX			XXX		XXX
		Tellurium			XXX			XXX			XXX		XXX
		Terbium			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Thorium			XXX			XXX			XXX		XXX
		Thulium			XXX			XXX			XXX		XXX
		Tin			XXX			XXX			XXX		XXX
		Titanium			XXX			XXX			XXX		XXX
		Tungsten			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - COPPER, LEAD, ZINC, NICKEL SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Ytterbium			XXX			XXX			XXX		XXX
		Yttrium			XXX			XXX			XXX		XXX
		Zinc			XXX			XXX			XXX		XXX
		Zirconium			XXX			XXX			XXX		XXX
M1'	Chlorides	Chlorides			XXX			XXX			XXX		XXX
M2'	Cyanates	Cyanates		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M4'	Sulphates	Sulphates		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M5'	Iron	Iron			XXX			XXX			XXX		XXX
M6'	Thiocyanates	Thiocyanates			XXX			XXX			XXX		XXX
M7'	Uranium	Uranium			XXX			XXX			XXX		XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)			XXX			XXX			XXX		XXX

* Only when an effluent exists

' Refer to Schedules C and D

'' Only when used as a process reagent.

''' Only when the mine is using backfill from a mill that uses the parameter as a reagent.

'''' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

''''' Required only at those plants that use or store PCBs.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - GOLD SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		XXX	XXX		XXX	XXX				XXX	XXX
2	Total cyanide	Total cyanide	XXX		XXX	X**		XXX				XXX	XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX				XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium	XXX		XXX	XXX		XXX				XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX					
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX				XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX					XXX
5b		Total organic carbon (TOC)			XXX			XXX					XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX				XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX					XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX				XXX	XXX
		Volatile suspended solids (VSS)			XXX			XXX					XXX
9	Total metals	Aluminum			XXX			XXX					XXX
		Beryllium		XXX	XXX		XXX	XXX					XXX
		Cadmium			XXX			XXX					XXX
		Chromium		XXX	XXX		XXX	XXX					XXX
		Cobalt	X**		XXX	X**		XXX					XXX
		Copper	X**		XXX	X**		XXX					XXX
		Lead											

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - GOLD SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX					XXX
		Nickel	X**		XXX	X**		XXX					XXX
		Silver			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Vanadium			XXX			XXX					XXX
		Zinc	X**		XXX	X**		XXX					XXX
10	Hydrides	Antimony			XXX			XXX					XXX
		Arsenic	X**		XXX	X**		XXX				XXX	XXX
		Selenium			XXX			XXX					XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX					XXX
12	Mercury	Mercury		XXX	XXX		XXX	XXX				XXX	XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX				XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX					XXX
		1,1,2-Trichloroethane			XXX			XXX					XXX
		1,1-Dichloroethane			XXX			XXX					XXX
		1,1-Dichloroethylene			XXX			XXX					XXX
		1,2-Dichlorobenzene			XXX			XXX					XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX					XXX
		1,2-Dichloropropane			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR – GROUP A REGULATION

SCHEDULE A – GOLD SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX					XXX
		1,4-Dichlorobenzene			XXX			XXX					XXX
		Bromoform			XXX			XXX					XXX
		Bromomethane			XXX			XXX					XXX
		Carbon tetrachloride			XXX			XXX					XXX
		Chlorobenzene			XXX			XXX					XXX
		Chloroform			XXX			XXX					XXX
		Chloromethane			XXX			XXX					XXX
		Cis-1,3-Dichloropropylene			XXX			XXX					XXX
		Dibromochloromethane			XXX			XXX					XXX
		Ethylene dibromide			XXX			XXX					XXX
		Methylene chloride			XXX			XXX					XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX					XXX
		Trans-1,2-Dichloroethylene			XXX			XXX					XXX
		Trans-1,3-Dichloropropylene			XXX			XXX					XXX
		Trichloroethylene			XXX			XXX					XXX
		Trichlorofluoromethane			XXX			XXX					XXX
		Vinylchloride (Chloroethylene)			XXX			XXX					
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX					XXX
		Styrene			XXX			XXX					XXX
		Toluene			XXX			XXX					XXX
		o-Xylene			XXX			XXX					XXX
		m-Xylene and p-Xylene			XXX			XXX					XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX					XXX
		Acrylonitrile			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - GOLD SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX					XXX
		5-nitro Acenaphthene			XXX			XXX					XXX
		Acenaphthylene			XXX			XXX					XXX
		Anthracene			XXX			XXX					XXX
		Benz(a)anthracene			XXX			XXX					XXX
		Benzo(a)pyrene			XXX			XXX					XXX
		Benzo(b)fluoranthene			XXX			XXX					XXX
		Benzo(g,h,i)perylene			XXX			XXX					XXX
		Benzo(k)fluoranthene			XXX			XXX					XXX
		Biphenyl			XXX			XXX					XXX
		Camphene			XXX			XXX					XXX
		1-Chloronaphthalene			XXX			XXX					XXX
		2-Chloronaphthalene			XXX			XXX					XXX
		Chrysene			XXX			XXX					XXX
		Dibenz(a,h)anthracene			XXX			XXX					XXX
		Fluoranthene			XXX			XXX					XXX
		Fluorene			XXX			XXX					XXX
		Indeno(1,2,3-cd)pyrene			XXX			XXX					XXX
		Indole			XXX			XXX					XXX
		1-Methylnaphthalene			XXX			XXX					XXX
		2-Methylnaphthalene			XXX			XXX					XXX
		Naphthalene			XXX			XXX					XXX
		Perylene			XXX			XXX					XXX
		Phenanthrene			XXX			XXX					XXX
		Pyrene			XXX			XXX					XXX
		Benzyl butyl phthalate			XXX			XXX					XXX
		Bis(2-Ethylhexyl) phthalate			XXX			XXX					XXX
		Di-n-butyl phthalate			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - GOLD SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether			XXX			XXX					XXX
		4-Chlorophenyl phenyl ether			XXX			XXX					XXX
		Bis(2-Chloroisopropyl)ether			XXX			XXX					XXX
		Bis(2-Chloroethyl)ether			XXX			XXX					XXX
		Diphenyl ether			XXX			XXX					XXX
					XXX			XXX					XXX
		2,4-Dinitrotoluene			XXX			XXX					XXX
		2,6-Dinitrotoluene			XXX			XXX					XXX
		Bis(2-Chloroethoxy)methane			XXX			XXX					XXX
		Diphenylamine			XXX			XXX					XXX
		N-Nitrosodiphenylamine			XXX			XXX					XXX
		N-Nitrosodi-n-propylamine			XXX			XXX					XXX
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX					XXX
		2,3,4,6-Tetrachlorophenol			XXX			XXX					XXX
		2,3,5,6-Tetrachlorophenol			XXX			XXX					XXX
		2,3,4-Trichlorophenol			XXX			XXX					XXX
		2,3,5-Trichlorophenol			XXX			XXX					XXX
		2,4,5-Trichlorophenol			XXX			XXX					XXX
		2,4,6-Trichlorophenol			XXX			XXX					XXX
		2,4-Dimethyl phenol			XXX			XXX					XXX
		2,4-Dinitrophenol			XXX			XXX					XXX
		2,4-Dichlorophenol			XXX			XXX					XXX
		2,6-Dichlorophenol			XXX			XXX					XXX
		4,6-Dinitro-o-cresol			XXX			XXX					XXX
		2-Chlorophenol			XXX			XXX					XXX
		4-Chloro-3-methylphenol			XXX			XXX					XXX
		4-Nitrophenol			XXX			XXX					XXX

SCHEDULE A - GOLD SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q**
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
20	Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX					XXX
		o-Cresol			XXX			XXX					XXX
		p-Cresol			XXX			XXX					XXX
		Pentachlorophenol			XXX			XXX					XXX
		Phenol			XXX			XXX					
21	Extractables, Phenoxy Acid Herbicides												
22	Extractables, Organochlorine Pesticides												XXX
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,3,5-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,4,5-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,3-Trichlorobenzene			XXX			XXX					XXX
		1,2,4-Trichlorobenzene			XXX			XXX					XXX
		2,4,5-Trichlorotoluene			XXX			XXX					XXX
		Hexachlorobenzene			XXX			XXX					XXX
		Hexachlorobutadiene			XXX			XXX					XXX
		Hexachlorocyclopentadiene			XXX			XXX					XXX
		Hexachloroethane			XXX			XXX					XXX
		Octachlorostyrene			XXX			XXX					
		Pentachlorobenzene											XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ***	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX					XXX
		Octachlorodibenzo-p-dioxin			XXX			XXX					XXX
		Octachlorodibenzofuran			XXX			XXX					XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX					XXX

SCHEDULE A - GOLD SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q**
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans *** (continued)	Total heptachlorinated dibenzofurans			XXX			XXX					XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
		Total hexachlorinated dibenzofurans			XXX			XXX					XXX
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
		Total pentachlorinated dibenzofurans			XXX			XXX					XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX					
		Total tetrachlorinated dibenzofurans										XXX	XXX
25	Solvent Extractables	Oil and grease	XXX		XXX	XXX		XXX					
26	Fatty and Resin Acids												XXX
27	Polychlorinated Biphenyls ***	PCBs (Total)			XXX			XXX					XXX
28a	Open Characterization - Volatiles				XXX			XXX					XXX
28b	Open Characterization - Extractables				XXX			XXX					XXX
29	Open Characterization - Elemental	Aluminum			XXX			XXX					XXX
		Antimony			XXX			XXX					XXX
		Arsenic			XXX			XXX					XXX
		Barium			XXX			XXX					XXX
		Beryllium			XXX			XXX					XXX
		Bismuth			XXX			XXX					XXX
		Boron			XXX			XXX					XXX
		Cadmium			XXX			XXX					XXX
		Calcium			XXX			XXX					XXX

SCHEDULE A - GOLD SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Cerium			XXX			XXX					XXX
		Cesium			XXX			XXX					XXX
		Chromium			XXX			XXX					XXX
		Cobalt			XXX			XXX					XXX
		Copper			XXX			XXX					XXX
		Dysprosium			XXX			XXX					XXX
		Erbium			XXX			XXX					XXX
		Europium			XXX			XXX					XXX
		Gadolinium			XXX			XXX					XXX
		Gallium			XXX			XXX					XXX
		Germanium			XXX			XXX					XXX
		Gold			XXX			XXX					XXX
		Hafnium			XXX			XXX					XXX
		Holmium			XXX			XXX					XXX
		Indium			XXX			XXX					XXX
		Iridium			XXX			XXX					XXX
		Iron			XXX			XXX					XXX
		Lanthanum			XXX			XXX					XXX
		Lead			XXX			XXX					XXX
		Lithium			XXX			XXX					XXX
		Lutetium			XXX			XXX					XXX
		Magnesium			XXX			XXX					XXX
		Manganese			XXX			XXX					XXX
		Mercury			XXX			XXX					XXX
		Molybdenum			XXX			XXX					XXX
		Neodymium			XXX			XXX					XXX
		Nickel			XXX			XXX					XXX
		Niobium			XXX			XXX					XXX
		Osmium			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - GOLD SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX					XXX
		Phosphorus			XXX			XXX					XXX
		Platinum			XXX			XXX					XXX
		Potassium			XXX			XXX					XXX
		Praesodymium			XXX			XXX					XXX
		Rhenium			XXX			XXX					XXX
		Rhodium			XXX			XXX					XXX
		Rubidium			XXX			XXX					XXX
		Ruthenium			XXX			XXX					XXX
		Samarium			XXX			XXX					XXX
		Scandium			XXX			XXX					XXX
		Selenium			XXX			XXX					XXX
		Silicon			XXX			XXX					XXX
		Silver			XXX			XXX					XXX
		Sodium			XXX			XXX					XXX
		Strontium			XXX			XXX					XXX
		Sulfur			XXX			XXX					XXX
		Tantalum			XXX			XXX					XXX
		Tellurium			XXX			XXX					XXX
		Terbium			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Thorium			XXX			XXX					XXX
		Thulium			XXX			XXX					XXX
		Tin			XXX			XXX					XXX
		Titanium			XXX			XXX					XXX
		Tungsten			XXX			XXX					XXX

SCHEDULE A - GOLD SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX					XXX
		Vanadium			XXX			XXX					XXX
		Ytterbium			XXX			XXX					XXX
		Yttrium			XXX			XXX					XXX
		Zinc			XXX			XXX					XXX
		Zirconium			XXX			XXX					XXX
M1'	Chlorides	Chlorides			XXX			XXX					XXX
M2'	Cyanates	Cyanates		XXX	XXX			XXX					XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX				XXX	XXX
M4'	Sulphates	Sulphates			XXX			XXX					XXX
M5'	Iron	Iron		XXX	XXX		XXX	XXX				XXX	XXX
M6'	Thiocyanates	Thiocyanates		XXX	XXX			XXX					XXX
M7'	Uranium	Uranium			XXX			XXX					XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)	XXX		XXX	X**		XXX					XXX

* Only when an effluent exists

' Refer to Schedules C and D

** Only when the mine is using backfill from a mill that uses the parameter as a reagent.

'' Only for companies mining or milling more than 1,000 tonnes of ore per day. For all others, these parameters are monthly.

*** One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

''' Required only at those plants that use or store PCBs.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		XXX	XXX		XXX	XXX				XXX	XXX
2	Total cyanide	Total cyanide			XXX			XXX					XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX				XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium	XXX		XXX	XXX		XXX				XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX				XXX	XXX
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX				XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX					XXX
5b		Total organic carbon (TOC)			XXX			XXX					XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX				XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX					XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX				XXX	XXX
		Volatile suspended solids (VSS)											
9	Total metals	Aluminum			XXX			XXX					XXX
		Beryllium			XXX			XXX					XXX
		Cadmium		XXX	XXX		XXX	XXX				XXX	XXX
		Chromium		XXX	XXX		XXX	XXX				XXX	XXX
		Cobalt		XXX	XXX		XXX	XXX				XXX	XXX
		Copper		XXX	XXX		XXX	XXX				XXX	XXX
		Lead		XXX	XXX		XXX	XXX				XXX	XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX					XXX
		Nickel		XXX	XXX		XXX	XXX				XXX	XXX
		Silver			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Vanadium		XXX	XXX		XXX	XXX				XXX	XXX
		Zinc		XXX	XXX		XXX	XXX				XXX	XXX
10	Hydrides	Antimony			XXX			XXX					XXX
		Arsenic		XXX	XXX		XXX	XXX				XXX	XXX
		Selenium			XXX			XXX					XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX					XXX
12	Mercury	Mercury		XXX	XXX		XXX	XXX				XXX	XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX				XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX					XXX
		1,1,2-Trichloroethane			XXX			XXX					XXX
		1,1-Dichloroethane			XXX			XXX					XXX
		1,1-Dichloroethylene			XXX			XXX					XXX
		1,2-Dichlorobenzene			XXX			XXX					XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX					XXX
		1,2-Dichloropropane			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX					XXX
		1,4-Dichlorobenzene			XXX			XXX					XXX
		Bromoform			XXX			XXX					XXX
		Bromomethane			XXX			XXX					XXX
		Carbon tetrachloride			XXX			XXX					XXX
		Chlorobenzene			XXX			XXX					XXX
		Chloroform			XXX			XXX					XXX
		Chloromethane			XXX			XXX					XXX
		Cis-1,3-Dichloropropylene			XXX			XXX					XXX
		Dibromochloromethane			XXX			XXX					XXX
		Ethylene dibromide			XXX			XXX					XXX
		Methylene chloride			XXX			XXX					XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX					XXX
		Trans-1,2-Dichloroethylene			XXX			XXX					XXX
		Trans-1,3-Dichloropropylene			XXX			XXX					XXX
		Trichloroethylene			XXX			XXX					XXX
		Trichlorofluoromethane			XXX			XXX					XXX
		Vinylchloride (Chloroethylene)			XXX			XXX					XXX
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX					XXX
		Styrene			XXX			XXX					XXX
		Toluene			XXX			XXX					XXX
		o-Xylene			XXX			XXX					XXX
		m-Xylene and p-Xylene			XXX			XXX					XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX					XXX
		Acrylonitrile			XXX			XXX					XXX

SCHEDULE A - IRON SUBSECTOR

Not Applicable

STREAM CLASSIFICATION:		Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
FREQUENCY OF SAMPLING:		3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral											
	Acenaphthene			XXX			XXX					XXX
	5-nitro Acenaphthene			XXX			XXX					XXX
	Acenaphthylene			XXX			XXX					XXX
	Anthracene			XXX			XXX					XXX
	Benz(a)anthracene			XXX			XXX					XXX
	Benzo(a)pyrene			XXX			XXX					XXX
	Benzo(b)fluoranthene			XXX			XXX					XXX
	Benzo(g,h,i)perylene			XXX			XXX					XXX
	Benzo(k)fluoranthene			XXX			XXX					XXX
	Biphenyl			XXX			XXX					XXX
	Camphene			XXX			XXX					XXX
	1-Chloronaphthalene			XXX			XXX					XXX
	2-Chloronaphthalene			XXX			XXX					XXX
	Chrysene			XXX			XXX					XXX
	Dibenz(a,h)anthracene			XXX			XXX					XXX
	Fluoranthene			XXX			XXX					XXX
	Fluorene			XXX			XXX					XXX
	Indeno(1,2,3-cd)pyrene			XXX			XXX					XXX
	Indole			XXX			XXX					XXX
	1-Methylnaphthalene			XXX			XXX					XXX
	2-Methylnaphthalene			XXX			XXX					XXX
	Naphthalene			XXX			XXX					XXX
	Perylene			XXX			XXX					XXX
	Phenanthrene			XXX			XXX					XXX
	Pyrene			XXX			XXX					XXX
	Benzyl butyl phthalate			XXX			XXX					XXX
	Bis(2-Ethylhexyl) phthalate			XXX			XXX					XXX
	Di-n-butyl phthalate			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

Not Applicable

	STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
	FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q**
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
				XXX			XXX					XXX
19	Extractables, Base Neutral (continued)			XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
20	Extractables, Acid (Phenolics)			XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX
				XXX			XXX					XXX

SCHEDULE A - IRON SUBSECTOR

Not Applicable

	STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
	FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
												XXX
20 Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX					XXX
	o-Cresol			XXX			XXX					XXX
	p-Cresol			XXX			XXX					XXX
	Pentachlorophenol			XXX			XXX					XXX
	Phenol			XXX			XXX					
21 Extractables, Phenoxy Acid Herbicides												
22 Extractables, Organochlorine Pesticides												
												XXX
23 Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX					XXX
	1,2,3,5-Tetrachlorobenzene			XXX			XXX					XXX
	1,2,4,5-Tetrachlorobenzene			XXX			XXX					XXX
	1,2,3-Trichlorobenzene			XXX			XXX					XXX
	1,2,4-Trichlorobenzene			XXX			XXX					XXX
	2,4,5-Trichlorotoluene			XXX			XXX					XXX
	Hexachlorobenzene			XXX			XXX					XXX
	Hexachlorobutadiene			XXX			XXX					XXX
	Hexachlorocyclopentadiene			XXX			XXX					XXX
	Hexachloroethane			XXX			XXX					XXX
	Octachlorostyrene			XXX			XXX					XXX
	Pentachlorobenzene											
				XXX			XXX					XXX
24 Chlorinated Dibenzo-p-dioxins and Dibenzofurans **	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX					XXX
	Octachlorodibenzo-p-dioxin			XXX			XXX					XXX
	Octachlorodibenzofuran			XXX			XXX					XXX
	Total heptachlorinated dibenzo-p-dioxins											

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

Not Applicable

	STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
	FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ** (continued)											
	Total heptachlorinated dibenzofurans			XXX			XXX					XXX
	Total hexachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
	Total hexachlorinated dibenzofurans			XXX			XXX					XXX
	Total pentachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
	Total pentachlorinated dibenzofurans			XXX			XXX					XXX
	Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
	Total tetrachlorinated dibenzofurans											
25	Solvent Extractables											
	Oil and grease	XXX		XXX	XXX		XXX				XXX	XXX
26	Fatty and Resin Acids											
												XXX
27	Polychlorinated Biphenyls **			XXX			XXX					
	PCBs (Total)											XXX
28a	Open Characterization - Volatiles			XXX			XXX					
28b	Open Characterization - Extractables											XXX
29	Open Characterization - Elemental											
	Aluminum			XXX			XXX					XXX
	Antimony			XXX			XXX					XXX
	Arsenic			XXX			XXX					XXX
	Barium			XXX			XXX					XXX
	Beryllium			XXX			XXX					XXX
	Bismuth			XXX			XXX					XXX
	Boron			XXX			XXX					XXX
	Cadmium			XXX			XXX					XXX
	Calcium											

SCHEDULE A - IRON SUBSECTOR

Not Applicable

STREAM CLASSIFICATION:			Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
FREQUENCY OF SAMPLING:			3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Cerium			XXX			XXX					XXX
		Cesium			XXX			XXX					XXX
		Chromium			XXX			XXX					XXX
		Cobalt			XXX			XXX					XXX
		Copper			XXX			XXX					XXX
		Dysprosium			XXX			XXX					XXX
		Erbium			XXX			XXX					XXX
		Europium			XXX			XXX					XXX
		Gadolinium			XXX			XXX					XXX
		Gallium			XXX			XXX					XXX
		Germanium			XXX			XXX					XXX
		Gold			XXX			XXX					XXX
		Hafnium			XXX			XXX					XXX
		Holmium			XXX			XXX					XXX
		Indium			XXX			XXX					XXX
		Iridium			XXX			XXX					XXX
		Iron			XXX			XXX					XXX
		Lanthanum			XXX			XXX					XXX
		Lead			XXX			XXX					XXX
		Lithium			XXX			XXX					XXX
		Lutetium			XXX			XXX					XXX
		Magnesium			XXX			XXX					XXX
		Manganese			XXX			XXX					XXX
		Mercury			XXX			XXX					XXX
		Molybdenum			XXX			XXX					XXX
		Neodymium			XXX			XXX					XXX
		Nickel			XXX			XXX					XXX
		Niobium			XXX			XXX					XXX
		Osmium			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX					XXX
		Phosphorus			XXX			XXX					XXX
		Platinum			XXX			XXX					XXX
		Potassium			XXX			XXX					XXX
		Praesodymium			XXX			XXX					XXX
		Rhenium			XXX			XXX					XXX
		Rhodium			XXX			XXX					XXX
		Rubidium			XXX			XXX					XXX
		Ruthenium			XXX			XXX					XXX
		Samarium			XXX			XXX					XXX
		Scandium			XXX			XXX					XXX
		Selenium			XXX			XXX					XXX
		Silicon			XXX			XXX					XXX
		Silver			XXX			XXX					XXX
		Sodium			XXX			XXX					XXX
		Strontium			XXX			XXX					XXX
		Sulfur			XXX			XXX					XXX
		Tantalum			XXX			XXX					XXX
		Tellurium			XXX			XXX					XXX
		Terbium			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Thorium			XXX			XXX					XXX
		Thulium			XXX			XXX					XXX
		Tin			XXX			XXX					XXX
		Titanium			XXX			XXX					XXX
		Tungsten			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - IRON SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Not Applicable Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX					XXX
		Vanadium			XXX			XXX					XXX
		Ytterbium			XXX			XXX					XXX
		Yttrium			XXX			XXX					XXX
		Zinc			XXX			XXX					XXX
		Zirconium			XXX			XXX					XXX
M1'	Chlorides	Chlorides			XXX			XXX					XXX
M2'	Cyanates	Cyanates			XXX			XXX					XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX				XXX	XXX
M4'	Sulphates	Sulphates		XXX	XXX		XXX	XXX				XXX	XXX
M5'	Iron	Iron	XXX		XXX	XXX		XXX				XXX	XXX
M6'	Thiocyanates	Thiocyanates			XXX			XXX					XXX
M7'	Uranium	Uranium			XXX			XXX					XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)			XXX			XXX					XXX

* Only when an effluent exists

' Refer to Schedules C and D

** One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

'' Required only at those plants that use or store PCBs.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)			XXX			XXX				XXX	XXX
2	Total cyanide	Total cyanide		XXX	XXX			XXX				XXX	XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX				XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX	XXX		XXX	XXX				XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX				XXX	XXX
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX				XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX					XXX
5b		Total organic carbon (TOC)			XXX			XXX					XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX				XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX					XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX				XXX	XXX
		Volatile suspended solids (VSS)											
9	Total metals	Aluminum			XXX			XXX					XXX
		Beryllium			XXX			XXX					XXX
		Cadmium			XXX			XXX					XXX
		Chromium			XXX			XXX					XXX
		Cobalt			XXX			XXX					XXX
		Copper			XXX			XXX					XXX
		Lead			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX					XXX
		Nickel			XXX			XXX					XXX
		Silver			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Vanadium			XXX			XXX					XXX
		Zinc			XXX			XXX					XXX
10	Hydrides	Antimony			XXX			XXX					XXX
		Arsenic			XXX			XXX					XXX
		Selenium			XXX			XXX					XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX					XXX
12	Mercury	Mercury			XXX			XXX					XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX				XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX					XXX
		1,1,2-Trichloroethane			XXX			XXX					XXX
		1,1-Dichloroethane			XXX			XXX					XXX
		1,1-Dichloroethylene			XXX			XXX					XXX
		1,2-Dichlorobenzene			XXX			XXX					XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX					XXX
		1,2-Dichloropropane			XXX			XXX					XXX

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX					XXX
		1,4-Dichlorobenzene			XXX			XXX					XXX
		Bromoform			XXX			XXX					XXX
		Bromomethane			XXX			XXX					XXX
		Carbon tetrachloride			XXX			XXX					XXX
		Chlorobenzene			XXX			XXX					XXX
		Chloroform			XXX			XXX					XXX
		Chloromethane			XXX			XXX					XXX
		Cis-1,3-Dichloropropylene			XXX			XXX					XXX
		Dibromochloromethane			XXX			XXX					XXX
		Ethylene dibromide			XXX			XXX					XXX
		Methylene chloride			XXX			XXX					XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX					XXX
		Trans-1,2-Dichloroethylene			XXX			XXX					XXX
		Trans-1,3-Dichloropropylene			XXX			XXX					XXX
		Trichloroethylene			XXX			XXX					XXX
		Trichlorofluoromethane			XXX			XXX					XXX
		Vinyl chloride (Chloroethylene)			XXX			XXX					XXX
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX					XXX
		Styrene			XXX			XXX					XXX
		Toluene			XXX			XXX					XXX
		o-Xylene			XXX			XXX					XXX
		m-Xylene and p-Xylene			XXX			XXX					XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX					XXX
		Acrylonitrile			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

	STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
	FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED											
19 Extractables, Base Neutral	Acenaphthene			XXX			XXX					XXX
	5-nitro Acenaphthene			XXX			XXX					XXX
	Acenaphthylene			XXX			XXX					XXX
	Anthracene			XXX			XXX					XXX
	Benz(a)anthracene			XXX			XXX					XXX
	Benzo(a)pyrene			XXX			XXX					XXX
	Benzo(b)fluoranthene			XXX			XXX					XXX
	Benzo(g,h,i)perylene			XXX			XXX					XXX
	Benzo(k)fluoranthene			XXX			XXX					XXX
	Biphenyl			XXX			XXX					XXX
	Camphene			XXX			XXX					XXX
	1-Chloronaphthalene			XXX			XXX					XXX
	2-Chloronaphthalene			XXX			XXX					XXX
	Chrysene			XXX			XXX					XXX
	Dibenz(a,h)anthracene			XXX			XXX					XXX
	Fluoranthene			XXX			XXX					XXX
	Fluorene			XXX			XXX					XXX
	Indeno(1,2,3-cd)pyrene			XXX			XXX					XXX
	Indole			XXX			XXX					XXX
	1-Methylnaphthalene			XXX			XXX					XXX
	2-Methylnaphthalene			XXX			XXX					XXX
	Naphthalene			XXX			XXX					XXX
	Perylene			XXX			XXX					XXX
	Phenanthrene			XXX			XXX					XXX
	Pyrene			XXX			XXX					XXX
	Benzyl butyl phthalate			XXX			XXX					XXX
	Bis(2-Ethylhexyl) phthalate			XXX			XXX					XXX
	Di-n-butyl phthalate			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether			XXX			XXX					XXX
		4-Chlorophenyl phenyl ether			XXX			XXX					XXX
		Bis(2-Chloroisopropyl)ether			XXX			XXX					XXX
		Bis(2-Chloroethyl)ether			XXX			XXX					XXX
		Diphenyl ether			XXX			XXX					XXX
					XXX			XXX					XXX
		2,4-Dinitrotoluene			XXX			XXX					XXX
		2,6-Dinitrotoluene			XXX			XXX					XXX
		Bis(2-Chloroethoxy)methane			XXX			XXX					XXX
		Diphenylamine			XXX			XXX					XXX
		N-Nitrosodiphenylamine			XXX			XXX					XXX
		N-Nitrosodi-n-propylamine			XXX			XXX					XXX
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX					XXX
		2,3,4,6-Tetrachlorophenol			XXX			XXX					XXX
		2,3,5,6-Tetrachlorophenol			XXX			XXX					XXX
		2,3,4-Trichlorophenol			XXX			XXX					XXX
		2,3,5-Trichlorophenol			XXX			XXX					XXX
		2,4,5-Trichlorophenol			XXX			XXX					XXX
		2,4,6-Trichlorophenol			XXX			XXX					XXX
		2,4-Dimethyl phenol			XXX			XXX					XXX
		2,4-Dinitrophenol			XXX			XXX					XXX
		2,4-Dichlorophenol			XXX			XXX					XXX
		2,6-Dichlorophenol			XXX			XXX					XXX
		4,6-Dinitro-o-cresol			XXX			XXX					XXX
		2-Chlorophenol			XXX			XXX					XXX
		4-Chloro-3-methylphenol			XXX			XXX					XXX
		4-Nitrophenol			XXX			XXX					XXX

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
20	Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX					XXX
		o-Cresol			XXX			XXX					XXX
		p-Cresol			XXX			XXX					XXX
		Pentachlorophenol			XXX			XXX					XXX
		Phenol			XXX			XXX					XXX
21	Extractables, Phenoxy Acid Herbicides												
22	Extractables, Organochlorine Pesticides												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,3,5-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,4,5-Tetrachlorobenzene			XXX			XXX					XXX
		1,2,3-Trichlorobenzene			XXX			XXX					XXX
		1,2,4-Trichlorobenzene			XXX			XXX					XXX
		2,4,5-Trichlorotoluene			XXX			XXX					XXX
		Hexachlorobenzene			XXX			XXX					XXX
		Hexachlorobutadiene			XXX			XXX					XXX
		Hexachlorocyclopentadiene			XXX			XXX					XXX
		Hexachloroethane			XXX			XXX					XXX
		Octachlorostyrene			XXX			XXX					XXX
		Pentachlorobenzene			XXX			XXX					XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ''	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX					XXX
		Octachlorodibenzo-p-dioxin			XXX			XXX					XXX
		Octachlorodibenzofuran			XXX			XXX					XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans '' (continued)	Total heptachlorinated dibenzofurans			XXX			XXX					XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
		Total hexachlorinated dibenzofurans			XXX			XXX					XXX
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
		Total pentachlorinated dibenzofurans			XXX			XXX					XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX					XXX
		Total tetrachlorinated dibenzofurans			XXX			XXX					XXX
25	Solvent Extractables	Oil and grease	XXX		XXX	XXX		XXX				XXX	XXX
26	Fatty and Resin Acids												
27	Polychlorinated Biphenyls ***	PCBs (Total)			XXX			XXX					XXX
28a	Open Characterization - Volatiles				XXX			XXX					XXX
28b	Open Characterization - Extractables				XXX			XXX					XXX
29	Open Characterization - Elemental	Aluminum			XXX			XXX					XXX
		Antimony			XXX			XXX					XXX
		Arsenic			XXX			XXX					XXX
		Barium			XXX			XXX					XXX
		Beryllium			XXX			XXX					XXX
		Bismuth			XXX			XXX					XXX
		Boron			XXX			XXX					XXX
		Cadmium			XXX			XXX					XXX
		Calcium			XXX			XXX					XXX

SCHEDULE A - SALT SUBSECTOR

Not Applicable

	STREAM CLASSIFICATION:		Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Cerium			XXX			XXX					XXX
		Cesium			XXX			XXX					XXX
		Chromium			XXX			XXX					XXX
		Cobalt			XXX			XXX					XXX
		Copper			XXX			XXX					XXX
		Dysprosium			XXX			XXX					XXX
		Erbium			XXX			XXX					XXX
		Europium			XXX			XXX					XXX
		Gadolinium			XXX			XXX					XXX
		Gallium			XXX			XXX					XXX
		Germanium			XXX			XXX					XXX
		Gold			XXX			XXX					XXX
		Hafnium			XXX			XXX					XXX
		Holmium			XXX			XXX					XXX
		Indium			XXX			XXX					XXX
		Iridium			XXX			XXX					XXX
		Iron			XXX			XXX					XXX
		Lanthanum			XXX			XXX					XXX
		Lead			XXX			XXX					XXX
		Lithium			XXX			XXX					XXX
		Lutetium			XXX			XXX					XXX
		Magnesium			XXX			XXX					XXX
		Manganese			XXX			XXX					XXX
		Mercury			XXX			XXX					XXX
		Molybdenum			XXX			XXX					XXX
		Neodymium			XXX			XXX					XXX
		Nickel			XXX			XXX					XXX
		Niobium			XXX			XXX					XXX
		Osmium			XXX			XXX					XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX					XXX
		Phosphorus			XXX			XXX					XXX
		Platinum			XXX			XXX					XXX
		Potassium			XXX			XXX					XXX
		Praesodymium			XXX			XXX					XXX
		Rhenium			XXX			XXX					XXX
		Rhodium			XXX			XXX					XXX
		Rubidium			XXX			XXX					XXX
		Ruthenium			XXX			XXX					XXX
		Samarium			XXX			XXX					XXX
		Scandium			XXX			XXX					XXX
		Selenium			XXX			XXX					XXX
		Silicon			XXX			XXX					XXX
		Silver			XXX			XXX					XXX
		Sodium			XXX			XXX					XXX
		Strontium			XXX			XXX					XXX
		Sulfur			XXX			XXX					XXX
		Tantalum			XXX			XXX					XXX
		Tellurium			XXX			XXX					XXX
		Terbium			XXX			XXX					XXX
		Thallium			XXX			XXX					XXX
		Thorium			XXX			XXX					XXX
		Thulium			XXX			XXX					XXX
		Tin			XXX			XXX					XXX
		Titanium			XXX			XXX					XXX
		Tungsten			XXX			XXX					XXX

SCHEDULE A - SALT SUBSECTOR

Not Applicable

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q**	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX					XXX
		Vanadium			XXX			XXX					XXX
		Ytterbium			XXX			XXX					XXX
		Yttrium			XXX			XXX					XXX
		Zinc			XXX			XXX					XXX
		Zirconium			XXX			XXX					XXX
M1'	Chlorides	Chlorides	XXX		XXX	XXX		XXX				XXX	XXX
M2'	Cyanates	Cyanates			XXX			XXX					XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX				XXX	XXX
M4'	Sulphates	Sulphates			XXX			XXX					XXX
M5'	Iron	Iron			XXX			XXX					XXX
M6'	Thiocyanates	Thiocyanates			XXX			XXX					XXX
M7'	Uranium	Uranium			XXX			XXX					XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)			XXX			XXX					XXX

* Only when an effluent exists

' Refer to Schedules C and D

** 2 only required over a period of 12 months

'' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

*** Required only at those plants that use or store PCBs.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
2	Total cyanide	Total cyanide			XXX			XXX			XXX		XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX			XXX		XXX
5b		Total organic carbon (TOC)			XXX			XXX			XXX		XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX			XXX		XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Volatile suspended solids (VSS)											
9	Total metals	Aluminum			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Cadmium		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Chromium			XXX			XXX			XXX		XXX
		Cobalt		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Copper		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX
		Lead		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX			XXX		XXX
		Nickel		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX
		Silver			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Zinc		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX
10	Hydrides	Antimony			XXX			XXX			XXX		XXX
		Arsenic	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Selenium			XXX			XXX			XXX		XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX			XXX		XXX
12	Mercury	Mercury		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX	XXX		XXX	XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX			XXX		XXX
		1,1,2-Trichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethylene			XXX			XXX			XXX		XXX
		1,2-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX			XXX		XXX
		1,2-Dichloropropane			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,4-Dichlorobenzene			XXX			XXX			XXX		XXX
		Bromoform			XXX			XXX			XXX		XXX
		Bromomethane			XXX			XXX			XXX		XXX
		Carbon tetrachloride			XXX			XXX			XXX		XXX
		Chlorobenzene			XXX			XXX			XXX		XXX
		Chloroform			XXX			XXX			XXX		XXX
		Chloromethane			XXX			XXX			XXX		XXX
		Cis-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Dibromochloromethane			XXX			XXX			XXX		XXX
		Ethylene dibromide			XXX			XXX			XXX		XXX
		Methylene chloride			XXX			XXX			XXX		XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX			XXX		XXX
		Trans-1,2-Dichloroethylene			XXX			XXX			XXX		XXX
		Trans-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Trichloroethylene			XXX			XXX			XXX		XXX
		Trichlorofluoromethane			XXX			XXX			XXX		XXX
		Vinyl chloride (Chloroethylene)			XXX			XXX			XXX		XXX
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX			XXX		XXX
		Styrene			XXX			XXX			XXX		XXX
		Toluene			XXX			XXX			XXX		XXX
		o-Xylene			XXX			XXX			XXX		XXX
		m-Xylene and p-Xylene			XXX			XXX			XXX		XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX			XXX		XXX
		Acrylonitrile			XXX			XXX			XXX		XXX

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX			XXX		XXX
		5-nitro Acenaphthene			XXX			XXX			XXX		XXX
		Acenaphthylene			XXX			XXX			XXX		XXX
		Anthracene			XXX			XXX			XXX		XXX
		Benz(a)anthracene			XXX			XXX			XXX		XXX
		Benzo(a)pyrene			XXX			XXX			XXX		XXX
		Benzo(b)fluoranthene			XXX			XXX			XXX		XXX
		Benzo(g,h,i)perylene			XXX			XXX			XXX		XXX
		Benzo(k)fluoranthene			XXX			XXX			XXX		XXX
		Biphenyl			XXX			XXX			XXX		XXX
		Camphene			XXX			XXX			XXX		XXX
		1-Chloronaphthalene			XXX			XXX			XXX		XXX
		2-Chloronaphthalene			XXX			XXX			XXX		XXX
		Chrysene			XXX			XXX			XXX		XXX
		Dibenz(a,h)anthracene			XXX			XXX			XXX		XXX
		Fluoranthene			XXX			XXX			XXX		XXX
		Fluorene			XXX			XXX			XXX		XXX
		Indeno(1,2,3-cd)pyrene			XXX			XXX			XXX		XXX
		Indole			XXX			XXX			XXX		XXX
		1-Methylnaphthalene			XXX			XXX			XXX		XXX
		2-Methylnaphthalene			XXX			XXX			XXX		XXX
		Naphthalene			XXX			XXX			XXX		XXX
		Perylene			XXX			XXX			XXX		XXX
		Phenanthrene			XXX			XXX			XXX		XXX
		Pyrene			XXX			XXX			XXX		XXX
		Benzyl butyl phthalate			XXX			XXX			XXX		XXX
		Bis(2-Ethylhexyl) phthalate			XXX			XXX			XXX		XXX
		Di-n-butyl phthalate			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether			XXX			XXX			XXX		XXX
		4-Chlorophenyl phenyl ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroisopropyl)ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroethyl)ether			XXX			XXX			XXX		XXX
		Diphenyl ether			XXX			XXX			XXX		XXX
					XXX			XXX			XXX		XXX
		2,4-Dinitrotoluene			XXX			XXX			XXX		XXX
		2,6-Dinitrotoluene			XXX			XXX			XXX		XXX
		Bis(2-Chloroethoxy)methane			XXX			XXX			XXX		XXX
		Diphenylamine			XXX			XXX			XXX		XXX
		N-Nitrosodiphenylamine			XXX			XXX			XXX		XXX
		N-Nitrosodi-n-propylamine			XXX			XXX			XXX		XXX
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,5,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4-Trichlorophenol			XXX			XXX			XXX		XXX
		2,3,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,6-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4-Dimethyl phenol			XXX			XXX			XXX		XXX
		2,4-Dinitrophenol			XXX			XXX			XXX		XXX
		2,4-Dichlorophenol			XXX			XXX			XXX		XXX
		2,6-Dichlorophenol			XXX			XXX			XXX		XXX
		4,6-Dinitro-o-cresol			XXX			XXX			XXX		XXX
		2-Chlorophenol			XXX			XXX			XXX		XXX
		4-Chloro-3-methylphenol			XXX			XXX			XXX		XXX
		4-Nitrophenol			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
20	Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX			XXX		XXX
		o-Cresol			XXX			XXX			XXX		XXX
		p-Cresol			XXX			XXX			XXX		XXX
		Pentachlorophenol			XXX			XXX			XXX		XXX
		Phenol			XXX			XXX			XXX		XXX
21	Extractables, Phenoxy Acid Herbicides												
22	Extractables, Organochlorine Pesticides												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,4,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3-Trichlorobenzene			XXX			XXX			XXX		XXX
		1,2,4-Trichlorobenzene			XXX			XXX			XXX		XXX
		2,4,5-Trichlorotoluene			XXX			XXX			XXX		XXX
		Hexachlorobenzene			XXX			XXX			XXX		XXX
		Hexachlorobutadiene			XXX			XXX			XXX		XXX
		Hexachlorocyclopentadiene			XXX			XXX			XXX		XXX
		Hexachloroethane			XXX			XXX			XXX		XXX
		Octachlorostyrene			XXX			XXX			XXX		XXX
		Pentachlorobenzene			XXX			XXX			XXX		XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans **	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzofuran			XXX			XXX			XXX		XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ** (continued)	Total heptachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzofurans			XXX			XXX			XXX		XXX
25	Solvent Extractables	Oil and grease	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
26	Fatty and Resin Acids												
27	Polychlorinated Biphenyls **	PCBs (Total)			XXX			XXX			XXX		XXX
28a	Open Characterization - Volatiles				XXX			XXX			XXX		XXX
28b	Open Characterization - Extractables				XXX			XXX			XXX		XXX
29	Open Characterization - Elemental	Aluminum			XXX			XXX			XXX		XXX
		Antimony			XXX			XXX			XXX		XXX
		Arsenic			XXX			XXX			XXX		XXX
		Barium			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Bismuth			XXX			XXX			XXX		XXX
		Boron			XXX			XXX			XXX		XXX
		Cadmium			XXX			XXX			XXX		XXX
		Calcium			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Cerium			XXX			XXX			XXX		XXX
		Cesium			XXX			XXX			XXX		XXX
		Chromium			XXX			XXX			XXX		XXX
		Cobalt			XXX			XXX			XXX		XXX
		Copper			XXX			XXX			XXX		XXX
		Dysprosium			XXX			XXX			XXX		XXX
		Erbium			XXX			XXX			XXX		XXX
		Europium			XXX			XXX			XXX		XXX
		Gadolinium			XXX			XXX			XXX		XXX
		Gallium			XXX			XXX			XXX		XXX
		Germanium			XXX			XXX			XXX		XXX
		Gold			XXX			XXX			XXX		XXX
		Hafnium			XXX			XXX			XXX		XXX
		Holmium			XXX			XXX			XXX		XXX
		Indium			XXX			XXX			XXX		XXX
		Iridium			XXX			XXX			XXX		XXX
		Iron			XXX			XXX			XXX		XXX
		Lanthanum			XXX			XXX			XXX		XXX
		Lead			XXX			XXX			XXX		XXX
		Lithium			XXX			XXX			XXX		XXX
		Lutetium			XXX			XXX			XXX		XXX
		Magnesium			XXX			XXX			XXX		XXX
		Manganese			XXX			XXX			XXX		XXX
		Mercury			XXX			XXX			XXX		XXX
		Molybdenum			XXX			XXX			XXX		XXX
		Neodymium			XXX			XXX			XXX		XXX
		Nickel			XXX			XXX			XXX		XXX
		Niobium			XXX			XXX			XXX		XXX
		Osmium			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX			XXX		XXX
		Phosphorus			XXX			XXX			XXX		XXX
		Platinum			XXX			XXX			XXX		XXX
		Potassium			XXX			XXX			XXX		XXX
		Praesodymium			XXX			XXX			XXX		XXX
		Rhenium			XXX			XXX			XXX		XXX
		Rhodium			XXX			XXX			XXX		XXX
		Rubidium			XXX			XXX			XXX		XXX
		Ruthenium			XXX			XXX			XXX		XXX
		Samarium			XXX			XXX			XXX		XXX
		Scandium			XXX			XXX			XXX		XXX
		Selenium			XXX			XXX			XXX		XXX
		Silicon			XXX			XXX			XXX		XXX
		Silver			XXX			XXX			XXX		XXX
		Sodium			XXX			XXX			XXX		XXX
		Strontium			XXX			XXX			XXX		XXX
		Sulfur			XXX			XXX			XXX		XXX
		Tantalum			XXX			XXX			XXX		XXX
		Tellurium			XXX			XXX			XXX		XXX
		Terbium			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Thorium			XXX			XXX			XXX		XXX
		Thulium			XXX			XXX			XXX		XXX
		Tin			XXX			XXX			XXX		XXX
		Titanium			XXX			XXX			XXX		XXX
		Tungsten			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - SILVER SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Ytterbium			XXX			XXX			XXX		XXX
		Yttrium			XXX			XXX			XXX		XXX
		Zinc			XXX			XXX			XXX		XXX
		Zirconium			XXX			XXX			XXX		XXX
M1'	Chlorides	Chlorides			XXX			XXX			XXX		XXX
M2'	Cyanates	Cyanates			XXX			XXX			XXX		XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M4'	Sulphates	Sulphates			XXX			XXX		XXX	XXX	XXX	XXX
M5'	Iron	Iron		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M6'	Thiocyanates	Thiocyanates			XXX			XXX			XXX		XXX
M7'	Uranium	Uranium			XXX			XXX			XXX		XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)			XXX			XXX			XXX		XXX

* Only when an effluent exists

' Refer to Schedules C and D

** One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

'' Required only at those plants that use or store PCBs.

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
2	Total cyanide	Total cyanide			XXX			XXX			XXX		XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
4a	Nitrogen	Ammonia plus Ammonium	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Total Kjeldahl nitrogen		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
4b		Nitrate + Nitrite		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX			XXX		XXX
5b		Total organic carbon (TOC)			XXX			XXX			XXX		XXX
6	Total phosphorus	Total phosphorus		XXX	XXX		XXX	XXX		X**	XXX	XXX	XXX
7	Specific conductance	Specific conductance			XXX			XXX			XXX		XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
		Volatile suspended solids (VSS)											
9	Total metals	Aluminum			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Cadmium		XXX	XXX		XXX	XXX			XXX		XXX
		Chromium			XXX			XXX			XXX		XXX
		Cobalt		XXX	XXX		XXX	XXX			XXX	XXX	XXX
		Copper		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Lead		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
9	Total metals (continued)	Molybdenum			XXX			XXX			XXX		XXX
		Nickel		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Silver			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Zinc		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
10	Hydrides	Antimony			XXX			XXX			XXX		XXX
		Arsenic		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
		Selenium			XXX			XXX			XXX		XXX
11	Chromium (Hexavalent)	Chromium (Hexavalent)			XXX			XXX			XXX		XXX
12	Mercury	Mercury		XXX	XXX		XXX	XXX			XXX	XXX	XXX
13	Total alkyl lead	Tetra-alkyl lead											
		Tri-alkyl lead											
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
15	Sulphide	Sulphide											
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX			XXX		XXX
		1,1,2-Trichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethane			XXX			XXX			XXX		XXX
		1,1-Dichloroethylene			XXX			XXX			XXX		XXX
		1,2-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX			XXX		XXX
		1,2-Dichloropropane			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
16	Volatiles, Halogenated (continued)	1,3-Dichlorobenzene			XXX			XXX			XXX		XXX
		1,4-Dichlorobenzene			XXX			XXX			XXX		XXX
		Bromoform			XXX			XXX			XXX		XXX
		Bromomethane			XXX			XXX			XXX		XXX
		Carbon tetrachloride			XXX			XXX			XXX		XXX
		Chlorobenzene			XXX			XXX			XXX		XXX
		Chloroform			XXX			XXX			XXX		XXX
		Chloromethane			XXX			XXX			XXX		XXX
		Cis-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Dibromochloromethane			XXX			XXX			XXX		XXX
		Ethylene dibromide			XXX			XXX			XXX		XXX
		Methylene chloride			XXX			XXX			XXX		XXX
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX			XXX		XXX
		Trans-1,2-Dichloroethylene			XXX			XXX			XXX		XXX
		Trans-1,3-Dichloropropylene			XXX			XXX			XXX		XXX
		Trichloroethylene			XXX			XXX			XXX		XXX
		Trichlorofluoromethane			XXX			XXX			XXX		XXX
		Vinyl chloride (Chloroethylene)			XXX			XXX			XXX		
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX			XXX		XXX
		Styrene			XXX			XXX			XXX		XXX
		Toluene			XXX			XXX			XXX		XXX
		o-Xylene			XXX			XXX			XXX		XXX
		m-Xylene and p-Xylene			XXX			XXX			XXX		XXX
18	Volatiles, Water Soluble	Acrolein			XXX			XXX			XXX		XXX
		Acrylonitrile			XXX			XXX			XXX		XXX

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX			XXX		XXX
		5-nitro Acenaphthene			XXX			XXX			XXX		XXX
		Acenaphthylene			XXX			XXX			XXX		XXX
		Anthracene			XXX			XXX			XXX		XXX
		Benz(a)anthracene			XXX			XXX			XXX		XXX
		Benzo(a)pyrene			XXX			XXX			XXX		XXX
		Benzo(b)fluoranthene			XXX			XXX			XXX		XXX
		Benzo(g,h,i)peryiene			XXX			XXX			XXX		XXX
		Benzo(k)fluoranthene			XXX			XXX			XXX		XXX
		Biphenyl			XXX			XXX			XXX		XXX
		Camphene			XXX			XXX			XXX		XXX
		1-Chloronaphthalene			XXX			XXX			XXX		XXX
		2-Chloronaphthalene			XXX			XXX			XXX		XXX
		Chrysene			XXX			XXX			XXX		XXX
		Dibenz(a,h)anthracene			XXX			XXX			XXX		XXX
		Fluoranthene			XXX			XXX			XXX		XXX
		Fluorene			XXX			XXX			XXX		XXX
		Indeno(1,2,3-cd)pyrene			XXX			XXX			XXX		XXX
		Indole			XXX			XXX			XXX		XXX
		1-Methylnaphthalene			XXX			XXX			XXX		XXX
		2-Methylnaphthalene			XXX			XXX			XXX		XXX
		Naphthalene			XXX			XXX			XXX		XXX
		Perylene			XXX			XXX			XXX		XXX
		Phenanthrene			XXX			XXX			XXX		XXX
		Pyrene			XXX			XXX			XXX		XXX
		Benzyl butyl phthalate			XXX			XXX			XXX		XXX
		Bis(2-Ethylhexyl) phthalate			XXX			XXX			XXX		XXX
		Di-n-butyl phthalate			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether			XXX			XXX			XXX		XXX
		4-Chlorophenyl phenyl ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroisopropyl)ether			XXX			XXX			XXX		XXX
		Bis(2-Chloroethyl)ether			XXX			XXX			XXX		XXX
		Diphenyl ether			XXX			XXX			XXX		XXX
					XXX			XXX			XXX		XXX
		2,4-Dinitrotoluene			XXX			XXX			XXX		XXX
		2,6-Dinitrotoluene			XXX			XXX			XXX		XXX
		Bis(2-Chloroethoxy)methane			XXX			XXX			XXX		XXX
		Diphenylamine			XXX			XXX			XXX		XXX
		N-Nitrosodiphenylamine			XXX			XXX			XXX		XXX
		N-Nitrosodi-n-propylamine											
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,5,6-Tetrachlorophenol			XXX			XXX			XXX		XXX
		2,3,4-Trichlorophenol			XXX			XXX			XXX		XXX
		2,3,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,5-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4,6-Trichlorophenol			XXX			XXX			XXX		XXX
		2,4-Dimethyl phenol			XXX			XXX			XXX		XXX
		2,4-Dinitrophenol			XXX			XXX			XXX		XXX
		2,4-Dichlorophenol			XXX			XXX			XXX		XXX
		2,6-Dichlorophenol			XXX			XXX			XXX		XXX
		4,6-Dinitro-o-cresol			XXX			XXX			XXX		XXX
		2-Chlorophenol			XXX			XXX			XXX		XXX
		4-Chloro-3-methylphenol			XXX			XXX			XXX		XXX
		4-Nitrophenol			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
20	Extractables, Acid (Phenolics)	m-Cresol			XXX			XXX			XXX		XXX
		o-Cresol			XXX			XXX			XXX		XXX
		p-Cresol			XXX			XXX			XXX		XXX
		Pentachlorophenol			XXX			XXX			XXX		XXX
		Phenol			XXX			XXX			XXX		XXX
21	Extractables, Phenoxy Acid Herbicides												
22	Extractables, Organochlorine Pesticides												
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,4,5-Tetrachlorobenzene			XXX			XXX			XXX		XXX
		1,2,3-Trichlorobenzene			XXX			XXX			XXX		XXX
		1,2,4-Trichlorobenzene			XXX			XXX			XXX		XXX
		2,4,5-Trichlorotoluene			XXX			XXX			XXX		XXX
		Hexachlorobenzene			XXX			XXX			XXX		XXX
		Hexachlorobutadiene			XXX			XXX			XXX		XXX
		Hexachlorocyclopentadiene			XXX			XXX			XXX		XXX
		Hexachloroethane			XXX			XXX			XXX		XXX
		Octachlorostyrene			XXX			XXX			XXX		XXX
		Pentachlorobenzene			XXX			XXX			XXX		XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ''	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzo-p-dioxin			XXX			XXX			XXX		XXX
		Octachlorodibenzofuran			XXX			XXX			XXX		XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans ** (continued)	Total heptachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total hexachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total pentachlorinated dibenzofurans			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX			XXX		XXX
		Total tetrachlorinated dibenzofurans			XXX			XXX			XXX		XXX
25	Solvent Extractables	Oil and grease	XXX		XXX	XXX		XXX	XXX		XXX	XXX	XXX
26	Fatty and Resin Acids												
27	Polychlorinated Biphenyls ***	PCBs (Total)			XXX			XXX			XXX		XXX
28a	Open Characterization - Volatiles				XXX			XXX			XXX		XXX
28b	Open Characterization - Extractables				XXX			XXX			XXX		XXX
29	Open Characterization - Elemental	Aluminum			XXX			XXX			XXX		XXX
		Antimony			XXX			XXX			XXX		XXX
		Arsenic			XXX			XXX			XXX		XXX
		Barium			XXX			XXX			XXX		XXX
		Beryllium			XXX			XXX			XXX		XXX
		Bismuth			XXX			XXX			XXX		XXX
		Boron			XXX			XXX			XXX		XXX
		Cadmium			XXX			XXX			XXX		XXX
		Calcium			XXX			XXX			XXX		XXX

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Cerium			XXX			XXX			XXX		XXX
		Cesium			XXX			XXX			XXX		XXX
		Chromium			XXX			XXX			XXX		XXX
		Cobalt			XXX			XXX			XXX		XXX
		Copper			XXX			XXX			XXX		XXX
		Dysprosium			XXX			XXX			XXX		XXX
		Erbium			XXX			XXX			XXX		XXX
		Europium			XXX			XXX			XXX		XXX
		Gadolinium			XXX			XXX			XXX		XXX
		Gallium			XXX			XXX			XXX		XXX
		Germanium			XXX			XXX			XXX		XXX
		Gold			XXX			XXX			XXX		XXX
		Hafnium			XXX			XXX			XXX		XXX
		Holmium			XXX			XXX			XXX		XXX
		Indium			XXX			XXX			XXX		XXX
		Iridium			XXX			XXX			XXX		XXX
		Iron			XXX			XXX			XXX		XXX
		Lanthanum			XXX			XXX			XXX		XXX
		Lead			XXX			XXX			XXX		XXX
		Lithium			XXX			XXX			XXX		XXX
		Lutetium			XXX			XXX			XXX		XXX
		Magnesium			XXX			XXX			XXX		XXX
		Manganese			XXX			XXX			XXX		XXX
		Mercury			XXX			XXX			XXX		XXX
		Molybdenum			XXX			XXX			XXX		XXX
		Neodymium			XXX			XXX			XXX		XXX
		Nickel			XXX			XXX			XXX		XXX
		Niobium			XXX			XXX			XXX		XXX
		Osmium			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Palladium			XXX			XXX			XXX		XXX
		Phosphorus			XXX			XXX			XXX		XXX
		Platinum			XXX			XXX			XXX		XXX
		Potassium			XXX			XXX			XXX		XXX
		Praesodymium			XXX			XXX			XXX		XXX
		Rhenium			XXX			XXX			XXX		XXX
		Rhodium			XXX			XXX			XXX		XXX
		Rubidium			XXX			XXX			XXX		XXX
		Ruthenium			XXX			XXX			XXX		XXX
		Samarium			XXX			XXX			XXX		XXX
		Scandium			XXX			XXX			XXX		XXX
		Selenium			XXX			XXX			XXX		XXX
		Silicon			XXX			XXX			XXX		XXX
		Silver			XXX			XXX			XXX		XXX
		Sodium			XXX			XXX			XXX		XXX
		Strontium			XXX			XXX			XXX		XXX
		Sulfur			XXX			XXX			XXX		XXX
		Tantalum			XXX			XXX			XXX		XXX
		Tellurium			XXX			XXX			XXX		XXX
		Terbium			XXX			XXX			XXX		XXX
		Thallium			XXX			XXX			XXX		XXX
		Thorium			XXX			XXX			XXX		XXX
		Thulium			XXX			XXX			XXX		XXX
		Tin			XXX			XXX			XXX		XXX
		Titanium			XXX			XXX			XXX		XXX
		Tungsten			XXX			XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP A REGULATION

SCHEDULE A - URANIUM SUBSECTOR

		STREAM CLASSIFICATION:	Process Effluent			Minewater Effluent			Smelter/Refinery Effluent			Storm Water Effluent	
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED											
29	Open Characterization - Elemental (continued)	Uranium			XXX			XXX			XXX		XXX
		Vanadium			XXX			XXX			XXX		XXX
		Ytterbium			XXX			XXX			XXX		XXX
		Yttrium			XXX			XXX			XXX		XXX
		Zinc			XXX			XXX			XXX		XXX
		Zirconium			XXX			XXX			XXX		XXX
M1'	Chlorides	Chlorides			XXX			XXX			XXX		XXX
M2'	Cyanates	Cyanates			XXX			XXX			XXX		XXX
M3'	Dissolved solids	Dissolved solids		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M4'	Sulphates	Sulphates		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M5'	Iron	Iron		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M6'	Thiocyanates	Thiocyanates			XXX			XXX			XXX		XXX
M7'	Uranium	Uranium		XXX	XXX		XXX	XXX		XXX	XXX	XXX	XXX
M8'	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)			XXX			XXX			XXX		XXX

* Only when an effluent exists

' Refer to Schedules C and D

** Port Hope Refinery only

'' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

*** Required only at those plants that use or store PCBs

ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

SCHEDULE B

PLANT	SAMPLING POINT
COPPER, LEAD, ZINC, NICKEL SUBSECTOR	
Inco Limited Shebandowan Property Thunder Bay, Ontario	Final Discharge Process Effluent
Inco Limited Copper Cliff Treatment Plant Sudbury, Ontario	Final Discharge Process Effluent
Inco Limited Nolin Creek Treatment Plant Sudbury, Ontario	Final Discharge Storm Water Effluent
Inco Limited Refinery Port Colborne, Ontario	Final Discharge Smelter/Refinery Effluent
Inco Limited Nickel Refinery Sudbury, Ontario	Discharge from Second Pond Smelter/Refinery Effluent
Inco Limited Crean Hill Sudbury, Ontario	Minewater Minewater Effluent
Inco Limited Levack Hill Sudbury, Ontario	Minewater Minewater Effluent
Inco Limited Garson Sudbury, Ontario	Minewater Culvert at Street Minewater Effluent
Inco Limited Whistle Sudbury, Ontario	Minewater Minewater Effluent
Falconbridge Limited Lockerby Sudbury, Ontario	Minewater Minewater Effluent
Falconbridge Limited Strathcona (Moose Lake) Sudbury, Ontario	Final Discharge Moose Creek at Fecunis Process Effluent
Falconbridge Limited Onaping Sudbury, Ontario	Discharge from Onaping Mine Pond Minewater Effluent

ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

SCHEDULE B

PLANT	SAMPLING POINT
COPPER, LEAD, ZINC, NICKEL SUBSECTOR (continued)	
Falconbridge Limited Falconbridge Sudbury, Ontario	Final Discharge at Nickel Iron Refinery Road Process Effluent
Mattabi Mines Limited Sturgeon Lake District of Kenora	Final Discharge Process Effluent Mine Creek Storm Water Effluent
Noranda Minerals Incorporated Lyon Lake Division District of Thunder Bay	Minewater Minewater Effluent
Noranda Minerals Incorporated Geco Division Manitouwadge, Ontario	Final Discharge Process Effluent
Minnova Incorporated Winston Lake Mine District of Thunder Bay	Final Discharge Process Effluent
Kidd Creek Mines Limited Kidd Creek Mine Kidd Township	Minewater Minewater Effluent
Kidd Creek Mines Limited Metallurgical Site Hoyle Township	Final Discharge Process Effluent
GOLD SUBSECTOR	
Placer-Dome Incorporated Campbell Red Lake Mine Golden Township	Final Discharge Balmer Creek at Bridge Process Effluent
Placer-Dome Incorporated Dona Lake Mine Pickle Lake, Ontario	Final Discharge Process Effluent
Placer-Dome Incorporated Dome Mine Timmins, Ontario	Final Discharge Process Effluent
Placer-Dome Incorporated Opapamiskan Lake Pickle Lake, Ontario (North-East)	Minewater Minewater Effluent EXP/DEV

SCHEDULE B

PLANT	SAMPLING POINT
GOLD SUBSECTOR (continued)	
Dickenson Mines Limited Arthur W. White Mine Golden Township	Final Discharge Balmer Creek at Bridge Process Effluent
Hemlo Gold Mines Incorporated Golden Giant Mine Hemlo, Ontario	Final Discharge Process Effluent
Lac Minerals Limited Page Williams Mine Hemlo, Ontario	Minewater Minewater Effluent Final Discharge Process Effluent
Lac Minerals Limited Macassa Division Kirkland Lake, Ontario	Final Discharge Process Effluent
Teck-Corona Operating Corporation David Bell Mine Hemlo, Ontario	Final Discharge Process Effluent
Ateba-Roxmark Joint Venture Magnet Mine Errington Township	Minewater Minewater Effluent EXP/DEV
Ateba Mines Limited Beardmore, Ontario	Polishing Pond Decant Process Effluent
Renabie Gold Mines Limited Renabie, Ontario	Final Discharge Process Effluent
Emerald Lake Resources Golden Rose Afton Township	Final Discharge Secondary Clearwater Pond Effluent Process Effluent
Giant Yellowknife Mines Limited Pamour-Schumacher Timmins, Ontario	Final Discharge Process Effluent Minewater Minewater Effluent
Giant Yellowknife Mines Limited Pamour #1 Timmins, Ontario	Final Discharge Process Effluent Minewater Minewater Effluent

ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

SCHEDULE B

PLANT	SAMPLING POINT
GOLD SUBSECTOR (continued)	
Giant Yellowknife Mines Limited Aunor-Delnite Timmins, Ontario	Minewater Minewater Effluent
Giant Yellowknife Mines Limited ERG Resources Timmins, Ontario	Final Discharge Process Effluent
Giant Yellowknife Mines Limited Ross Mine Timmins, Ontario	Minewater Minewater Effluent
Detour Lake Mines Limited Detour Lake Mine Detour Lake, Ontario	Final Discharge Process Effluent Minewater Minewater Effluent
Kidd Creek Mines Limited Owl Creek Mine Timmins, Ontario	Minewater Minewater Effluent
Canamax Resources Incorporated Kremzar Mine Finan Township	Final Discharge Process Effluent
Canamax Resources Incorporated Bell Creek Timmins, Ontario	Final Discharge Process Effluent
Canamax Resources Incorporated Marhill Timmins, Ontario	Minewater Minewater Effluent
Canamax Resources Incorporated Matheson East Zone Timmins, Ontario	Minewater Minewater Effluent
Canamax Resources Incorporated Clavas Project German Township	Minewater Minewater Effluent
St. Joe Canada Limited Muskegsagagen Lake District of Kenora	Final Discharge Process Effluent
McFinley Red Lake Mines Limited Bateman Township	Final Discharge Process Effluent

SCHEDULE B

PLANT	SAMPLING POINT
GOLD SUBSECTOR (continued)	
Muscocho Explorations Limited Majino Mine Finan Township Goudreau, Ontario	Final Discharge Process Effluent Minewater Minewater Effluent
Muscocho Explorations Limited Magnacon Mine Mishibishu Lake Wawa, Ontario	Minewater Minewater Effluent
Muscocho Explorations Limited Jerome Mine Osway Township	Minewater Minewater Effluent
Citadel Gold Mines Incorporated McMurray Township	Minewater Minewater Effluent
Granges Exploration Limited Mishibishu Lake Wawa, Ontario	Minewater Minewater Effluent
Tandem Resources/Storimin Exploration Moss Lake and Snodgrass Lake Moss Township	Minewater Minewater Effluent
Sandy K. Mines Limited Gowganda, Ontario	Final Discharge Process Effluent
Diepdaume Mines Limited Timmins, Ontario	Final Discharge Process Effluent
American Barrick Resources Corporation McDermott Harker Township	Final Discharge Process Effluent
Lac D'Aminante Du Quebec Limitee Aquarius Mine Timmins, Ontario	Final Discharge Process Effluent
Belmoral Mines Limited Broulan Reef Timmins, Ontario	Minewater Minewater Effluent
Belmoral Mines Limited Vedron Timmins, Ontario	Minewater Minewater Effluent

SCHEDULE B

PLANT	SAMPLING POINT
GOLD SUBSECTOR (continued)	
Golden Shield Resources Kerr Division Virginiatown, Ontario	Final Discharge Process Effluent
Getty Resources Davidson-Tisdale Timmins, Ontario	Minewater Minewater Effluent
St. Andrew Gold Fields Taylor Township	Minewater Minewater Effluent
St. Andrew Gold Fields Stock Township	Minewater Minewater Effluent
Wabigoon Development Incorporated Hunter Mine Timmins, Ontario	Minewater Minewater Effluent
Maude Lake Mine Carr Township	Minewater Minewater Effluent
Victoria Porcupine Resources Naybob Ogden Township	Minewater Minewater Effluent
Madeleine Mines Limited/Boise Minerals Incorporated Scramble Mine Jaffray-Melick Township	Minewater Minewater Effluent EXP/DEV
Orofino Resources Limited Silk Township	Minewater Minewater Effluent
Orofino Resources Limited Scadding Mine Scadding Township	Final Discharge Process Effluent

ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

SCHEDULE B

PLANT	SAMPLING POINT
IRON SUBSECTOR	
Dofasco Inc. Adams Mine Kirkland Lake, Ontario	Final Discharge Process Effluent
Dofasco Inc. The Sherman Mine Temagami	Tetapaga Weir Process Effluent
Algoma Steel Corporation Limited Algoma Ore Division Wawa, Ontario	Final Decant Process Effluent
SALT SUBSECTOR	
The Canadian Salt Company Limited Windsor, Ontario	E-1 Main Sewer Process Effluent E-6 Condensate Overflow Process Effluent Minewater (Ojibway Mine) Minewater Effluent
Domtar Chemicals Group SIFTO Salt Division Goderich, Ontario	Evaporator Plant Overflow from Lagoon to Maitland River Process Effluent Minewater Goderich Mine Minewater Effluent
SILVER SUBSECTOR	
Agnico-Eagle Mines Limited Penn Mill Cobalt, Ontario	Polishing Pond Effluent Process Effluent
Agnico-Eagle Mines Limited Langis Mine Casey Township	Minewater Minewater Effluent
Agnico-Eagle Mines Limited Beaver-Timiskaming Mine Cobalt, Ontario	Minewater Minewater Effluent

SCHEDULE B

PLANT	SAMPLING POINT
SILVER SUBSECTOR (continued)	
Agnico-Eagle Mines Limited Leroy Project Gowganda, Ontario	Minewater EXP/DEV
Agnico-Eagle Mines Limited Refinery Coleman Township, Ontario	Final Effluent Smelter/Refinery Effluent
Agnico-Eagle Mines Limited Silver Century Decline Project Coleman Township, Ontario	Minewater EXP/DEV
Hellens-Eplett Mining Incorporated Cobalt, Ontario	Secondary Tailings Pond Effluent Process Effluent
URANIUM SUBSECTOR	
Denison Mines Limited Elliot Lake, Ontario	Final Discharge Process Effluent Final Discharge Storm Water Effluent
Denison Mines Limited Stanrock Property Elliot Lake, Ontario	Final Discharge Storm Water Effluent
Rio Algom Limited Quirke Elliot Lake, Ontario	Final Discharge Process Effluent
Rio Algom Limited Lacnor/Nordic Elliot Lake, Ontario	Final Discharge Storm Water Effluent
Rio Algom Limited Pronto Spragge, Ontario	Final Discharge Storm Water Effluent
Rio Algom Limited Panel Elliot Lake, Ontario	Final Discharge Process Effluent
Rio Algom Limited Stanleigh Elliot Lake, Ontario	Final Discharge Process Effluent

SCHEDULE B

PLANT	SAMPLING POINT
URANIUM (continued)	
Cameco Refinery Blind River, Ontario	Final Discharge Prior to Addition of Sewage Lagoon Effluent Smelter/Refinery Effluent
Cameco Refinery Port Hope, Ontario	West UF6 Discharge Smelter/Refinery Effluent East UF6 Discharge Smelter/Refinery Effluent UO2 Discharge Smelter/Refinery Effluent

SCHEDULE C - SAMPLING PRINCIPLES

Column 1	Column 2	Column 3	Column 4	Col. 5	Column 6	Column 7
ANALYTICAL TEST GROUP	LABORATORY SAMPLE CONTAINER	LABORATORY CONTAINER PRE-TREATMENT	TEST SPECIFIC SAMPLING PRECAUTIONS	MIN. SAM VOL.	PRESERVATION METHOD	MAX. STORAGE TIME (DAYS)
Chlorides M1	Sample containers and caps/ liners must be composed only of one or more of the following materials: fluorocarbon resin, polyethylene terephthalate, glass, polystyrene, polypropylene, high or low density polyethylene. Metallic foil should not be used.	Generally no pre-treatment required for new containers.	If sample is high (>5%) in hydrocarbons or organic solvents, use glass or fluorocarbon resin sample container only.	50mL	None	28
Cyanates M2	See Analytical Test Group M1	See Analytical Test Group M1	See Analytical Test Group M1	500mL	Add sodium hydroxide (NaOH) (cyanide free) to raise pH to 12.	7
Dissolved Solids M3	See Analytical Test Group M1	See Analytical Test Group M1	See Analytical Test Group M1	100mL	None	7
Sulphates M4	See Analytical Test Group M1	See Analytical Test Group M1	See Analytical Test Group M1	50mL	None	28

SCHEDULE C - SAMPLING PRINCIPLES

Column 1 ANALYTICAL TEST GROUP	Column 2 LABORATORY SAMPLE CONTAINER	Column 3 LABORATORY CONTAINER PRE-TREATMENT	Column 4 TEST SPECIFIC SAMPLING PRECAUTIONS	Col. 5 MIN. SAM. VOL.	Column 6 PRESERVATION METHOD	Column 7 MAX. STORAGE TIME (DAYS)
Iron M5	See Analytical Test Group M1	If pre-treatment necessary, soak overnight in a 5% solution of nitric acid (HNO3), followed by several rinses in distilled water.	See Analytical Test Group M1	100mL	Add nitric acid (HNO3) (containing <1mg/L of all analytes) to lower pH to <2.	30
Thiocyanates M6	See Analytical Test Group M1	See Analytical Test Group M1	See Analytical Test Group M1	100mL	None	7
Uranium M7	See Analytical Test Group M1	See Analytical Test Group M5	See Analytical Test Group M1	100mL	See Analytical Test Group M5	30
Weak Acid Dissociable Cyanides (Free Cyanide) M8	See Analytical Test Group M1	See Analytical Test Group M1	See Analytical Test Group M1 If high cyanide suspected in sample, sample containers must be labelled "HAZARDOUS"	500mL	See Analytical Test Group M2	7

SCHEDULE D – ANALYTICAL PRINCIPLES & ANALYTICAL METHOD DETECTION LIMITS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
ANALYTICAL TEST GROUP *	PARAMETERS CONVENTIONAL AND METAL PARAMETERS	SAMPLE PREPARATION METHOD PRINCIPLES	INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ALTERNATE INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ANALYTICAL METHOD DETECTION LIMITS mg/L
M1	Chlorides	Preparation for measurement system as appropriate	Ion Chromatography or Colourimetry or Titration	N/A	2
M2	Cyanates	See Analytical Test Group M1	Ion Chromatography subject to chloride interferences	Colourimetry	-
M3	Dissolved Solids	Filter through glass fibre filter (particle retention size ≤ 2 micrometres)	Gravimetry, after drying at 103°C ± 3°C	N/A	20
M4	Sulphates	See Analytical Test Group M1	Ion Chromatography		5 as sulphate
M5	Iron	Nitric evaporation or aqua regia digestion	Atomic absorption spectrometry and/or Emission Spectrometry – Inductively Coupled Plasma (ICP) or Direct Current Argon Plasma Spectrometry (DCP)	Polarography via the method of standard addition in the presence of suitable electrolyte	0.02
M6	Thiocyanates	See Analytical Test Group M1	Ion Chromatography subject to chloride interferences	Colourimetry	-
M7	Uranium	See Analytical Test Group M5	Fluorescence Spectroscopy	N/A	0.02

SCHEDULE D – ANALYTICAL PRINCIPLES & ANALYTICAL METHOD DETECTION LIMITS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
ANALYTICAL TEST GROUP *	PARAMETERS CONVENTIONAL AND METAL PARAMETERS	SAMPLE PREPARATION METHOD PRINCIPLES	INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ALTERNATE INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ANALYTICAL METHOD DETECTION LIMITS mg/L
M8	Weak acid dissociable cyanides (Free cyanide)	See Analytical Test Group M1	Colourimetry	Ion Chromotogaphy with Electro Chemical Detection	-

PART IV

EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY: GROUP "A"

PART IV EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY: GROUP "A"

Introduction

The Explanatory Notes are meant to provide, where appropriate, an expanded description of each of the sections in the Draft Effluent Monitoring Regulation for Group "A" in order to further the reader's understanding of the requirements.

In conjunction with the protocols and procedures outlined in Ontario Regulation 358/88, the General Effluent Monitoring Regulation, the Group "A" Regulation specifies the effluent monitoring requirements for each discharger, including sampling, analysis, flow measurement, toxicity testing and reporting.

Section 1: Definitions

This section of the Regulation provides:

- clarification of terms used in the Regulation having several possible interpretations;
- definitions of technical terms used in the Regulation which may not be in common usage;
- definitions for those terms which have a different meaning in the Regulation than those found in a dictionary or through common use;
- definitions of terms with an alternate use in the Group "A" Regulation from that in the General Regulation; and
- definitions of terms specific to Group "A".

Subsection 1(2) states that the definitions in section 1 of the General Regulation also apply to this Regulation. However, a re-defined term in the Group "A" Regulation supersedes that of the General Regulation.

The Group "A" monitoring regulation follows as closely as possible Ontario Regulation 358/88. Consequently, terminology that is commonly used in the mining industry has been largely dropped in favour of the definitions that are found in Ontario Regulation 358/88. For example, a mine or mineral property including all associated facilities becomes a "plant", a tailings area decant becomes a "process effluent", a designated control point becomes a "process effluent sampling point" and runoff becomes "storm water". One term that has been retained is that of "minewater" since this effluent is unique to the industry.

Changes to definitions found in the General Regulation have been made for the purposes of the Group "A" Regulation as follows:

"composite sample" has been redefined to include three grab samples taken over a period of eight hours that are subsequently combined to form one sample. The difficulties that many Group "A" plants will encounter due to severe weather conditions, lack of power and remote locations was the reason for this change. In many cases, continuous sampling is not practical;

"grab sample" has been redefined to increase the time period to one hour over which the sample may be collected. The reason for this is that , in many cases, Group "A" plants simply may not be able to collect a sufficient volume of sample or a sufficient number of samples within the 15 minutes that the General Regulation calls for;

"process effluent" has been redefined to mean only those effluents being discharged from any tailings area or treatment facilities associated with the tailings area;

"storm water effluent" has been redefined to include runoff from inactive or abandoned tailings areas provided that the runoff is collected prior to being discharged to the environment.

The following definitions are included in the Group "A" Regulation rather than the General Regulation as they are referred to only in the context of the Group "A" Regulation:

- "calculated retention time";
- "exploration or development property";
- "Group "A";
- "minewater effluent";
- "minewater effluent sampling point";
- "Ontario Mineral Industry";
- "smelter/refinery";
- "smelter/refinery effluent";
- "smelter/refinery sampling point";
- "sub-sector";
- "tailings area".

Section 2: Purpose

The purpose of the Group "A" Regulation is to establish a data base on effluent quality in the Ontario Mineral Industry Sector that, along with other pertinent information such as available treatment technology, will be used in the development of effluent limits for Group "A" and to quantify the mass loadings of monitored contaminants discharged into surface watercourses.

Section 3: Application

All plants and effluents covered under the Ontario Mineral Industry Sector: Group "A" Effluent Monitoring Regulation are listed in Schedule B of the Regulation. A plant is exempt from the Effluent Monitoring Regulation if the name of the plant does not appear in Schedule B. Schedule B also gives the subsector that a plant falls under and notes the effluent sampling points that each plant has as well as the category that each effluent falls into for the purposes of monitoring.

Schedule B is being kept open as long as possible before the monitoring regulation is promulgated. The reason for this is to allow plants to be added to or deleted from Schedule B in order to reflect the most current operating status of the plants on the date of promulgation of the regulation. Unlike most other types of industry, mines may have a short life. This is due to the fact that ore reserves are finite in nature and, once exhausted, they no longer exist. In Ontario, many mines are in production for less than ten years. In addition, mines in Ontario, like most mines, are greatly influenced by international market prices and demand. Because of this, mines that are active can be quickly forced into an inactive state and vice versa. Also to be noted is the fact that many mining properties are subject to frequent changes in ownership and, as a result, the maintenance of an up-to-date list of plants is difficult.

It is the intent of the Ministry that the MISA Regulation requirements shall replace the monitoring requirements for those effluents under Certificates of Approval or Control Orders for the duration of the Regulation in cases of duplicate requirements. This override will not extend to any effluent stream not monitored in the Regulation and for which monitoring is required to assess the performance of various treatment systems or processes.

Section 4: Sampling Points

This section specifies that a sampling point must be established by the direct discharger for each effluent stream specified in the site-specific monitoring schedules. These sampling points must be used for all sampling required by the Group "A" Regulation unless an alternate sampling location is deemed acceptable by a Regional Director of the Ministry of the Environment.

There are only four types of effluent streams on which sampling points are to be established. These are:

- minewater effluent streams
- smelter/refinery effluent streams
- process effluent streams
- storm water effluent streams

It must be noted that all samples must be collected and analyzed according to the principles and protocols outlined in sections 3 and 4 of the General Regulation for sampling and analysis respectively. In addition, the subsector specific monitoring schedules (called Schedule A in the Group "A" Regulation) indicate the monitoring frequency required at each sampling point.

ROUTINE MONITORING

Section 5: Thrice Weekly Monitoring

Thrice weekly monitoring is required in all subsectors on all existing effluent streams. The nature of the monitoring varies from subsector to subsector (see Schedule A in the Group "A" Regulation). In general, thrice weekly parameters include: pH, suspended solids, ammonia, cyanide, copper, nickel, lead, zinc, arsenic, oil and grease, dissolved solids, sulphates, iron and chlorides and may include weak acid dissociable cyanides.

It should be noted that analytical data from thrice weekly and monthly sampling may be used towards fulfilling quarterly requirements, provided that all samples are taken on the same day and that all protocols required for quarterly samples are followed.

In general, parameters monitored on a thrice weekly basis are strong candidates for appearance in upcoming limits regulations.

Section 6: Monthly Monitoring

Monthly monitoring is required in all subsectors on all existing effluent streams. The nature of the monitoring varies from subsector to subsector (see Schedule A in the Group "A" Regulation). In general, monthly parameters include: chemical oxygen demand, total kjeldahl nitrogen, nitrates, nitrites, phosphorus, phenols and mercury and may include cadmium, cobalt, uranium, cyanates and thiocyanates.

CHARACTERIZATION

Section 7: Quarterly Monitoring

Quarterly monitoring is required in all subsectors on all existing effluent streams. Again, it must be emphasized that analytical data from thrice weekly and monthly sampling may be used towards fulfilling quarterly requirements provided that all samples are taken on the same day and that protocols required for quarterly samples are followed.

With one exception, quarterly sampling requirements are constant across all subsectors. The one exception is minewater effluent requirements in the salt subsector. Here, because of the very small effluent volumes involved and the routine nature of the effluent (saturated brine), only two "quarterly" samples are required at each of the two mines over the life of the regulation. In all other cases, 4 "quarterly" samples are required.

All quarterly samples involve the following parameters:

(a) the full EMPPL excluding sulphides, fatty and resin acids, alkyl leads, pesticides and herbicides. PCBs are to be run only at plants that use or store PCBs. Dioxins are to be done on a one-time basis only;

(b) open characterization for elements (Analytical Test Group 29) with detection limits set at 50 part per billion and open characterization for organics outside of EMPPL with detection and identification limits set as close to 1 part per billion as is possible;

(c) fish toxicity test and Daphnia magna acute lethality toxicity test.

With regard to sections 5, 6 and 7 above, many process effluents associated with the Ontario Mineral Industry are discharged to a receiving stream after being retained for lengthy periods of time. Discharge episodes are timed to take advantage of natural physical, biological and chemical processes that, depending on climatic conditions and, therefore, the time of year, reduce levels of some contaminants in the effluent. In these systems, discharge episodes can vary from a couple of days to a couple of months. A discharger is exempt from the requirements of the Effluent Monitoring Regulation during the period of time that a process effluent is being retained and no discharge occurs. However, during any period of discharge equal to or less than 15 days in any one or through two quarters, a discharger will be expected to obtain and analyse samples of its process effluent at the required frequency and for all parameters listed under the column "3W" in Schedule A. During any period of discharge greater than 15 days and equal to or less than 45 days in any one or through two quarters, a discharger will be expected to obtain and analyze samples of its process effluent at the required frequencies and for all parameters listed in the columns under "3W" and "M" in Schedule A. For any period of discharge greater than 45 days in any one or through two quarters, a discharger will be expected to obtain and analyse samples of its process effluent at the required frequencies and for all parameters listed in the columns under "3W", "M" and "Q" in Schedule A.

Section 8: Storm Water Monitoring

Nearly all storm water effluents found in Group "A" result from runoff at inactive tailings areas. These effluents tend to be continuous in nature since large areas of land are usually involved. However, during very dry periods or long periods of sub-zero temperatures, the presence of these effluents cannot be guaranteed. As a result, sampling of these effluents at a frequency no greater than once per month is required. Quarterly samples are required only when an effluent exists.

Section 9: Quality Control Monitoring

Each of the quality control samples to be collected provides information about the quality of the effluent samples collected and indicates possible field contamination. Quality control samples are to be taken with each quarterly sample taken at all effluent sampling points.

A travelling blank sample will provide an indication of any problems with sample contamination due to extraneous volatile fractions of contaminants in the atmosphere and any contaminants introduced by handling of the sample containers. Analytical test groups 1 (COD), 3 (pH) and 8 (TSS/VSS) are excluded from the analysis.

Travelling blanks for COD and TSS/VSS are relatively ineffective. Gross contamination would be required to be detected at the ppm levels of detection for these tests. No information relevant to samples is to be gained for pH on a travelling blank of distilled water.

A travelling spiked blank sample should provide an indication of the degree of degradation of the target parameters from sampling to analysis, which in turn may indicate degradation of the target parameters in the effluent sample itself. Only analytical test groups 16 through 21 are to be analyzed as they are most likely to volatilize or degrade in the unpreserved solution.

Travelling spiked blanks are not required for conventionals and metals. Most of the samples are either preserved or are analyzed within very short time periods.

The travelling spiked blank samples must be prepared with a standard solution which contains all of the parameters in the analytical test groups for which the analyses are required.

Additional quality control samples are to be analyzed and prepared by the laboratory, as outlined in section 4 of the General Regulation. These samples will provide an indication of analytical variability and laboratory contamination due to the analytical procedures.

The General Regulation requires that good maintenance and calibration practices for the measurement devices be followed.

Section 10: Toxicity Testing

Section 5 of the General Regulation specifies the test protocols which must be followed for the fish toxicity test and the Daphnia magna acute lethality toxicity test.

Toxicity test samples are to be collected quarterly at each effluent sampling point. If at all possible, these samples should be collected on the same day as the routine quarterly samples in order to aid in the interpretation and possible correlation of the chemical analyses and the resultant biological effects.

Effluent samples used for the fish toxicity and Daphnia magna tests are to be taken from the same sample container or set of containers in order to minimize the likelihood of sample differences.

It is not unusual for one fish in a serial dilution sample to suffer mortality due to natural causes. Therefore, mortality greater than two fish in most cases would be an indication of some effluent lethality.

Section 11: Flow Measurement

Protocols and procedures are outlined in section 6 of the General Regulation.

All Group "A" plants are required to use methods, devices or calculations for the measurement or estimation of flow that are capable of accuracy to plus or minus 20% of actual flow. The foregoing statement applies to all flows that are measured at a plant.

Because of the remote nature of many Group "A" sampling points, the lack of power at many sites, the severe weather conditions at many sampling points that exist for several months of the year and the generic nature of the Group "A" effluent monitoring regulation, continuous flow measurement is not required. Flow measurement must take place at the time of sampling.

Accurate flow measurement is expected to be an integral part of future limits regulations for Group "A" plants.

Section 12: Types of Samples Permitted

Grab samples are permitted as follows providing that the effluent, prior to sampling, has been retained for at least the prescribed period of time:

Effluent Type	Required Calculated Retention Time
Process Effluent	30 days
Minewater Effluent	5 days
Smelter/Refinery Effluent	5 days
Storm Water Effluent	0 days

The above grab samples are permitted only for samples that are being taken on a thrice weekly or monthly basis. Composite samples are required in all other cases and for all samples being taken on a quarterly basis. One exception to this rule is storm water effluent. Grab samples are permitted for all types of storm water samples.

When grab samples are to be taken, each direct discharger must report the "calculated retention time" and the method of calculation of the "calculated retention time" for all process effluents, minewater effluents and smelter/refinery effluents from which grab samples are to be taken.

Section 13: Reporting

Section 7 of the General Regulation outlines the reporting requirements for each direct discharger. The contents of an Initial Report to be submitted prior to monitoring under the Regulation are outlined in the General Regulation.

All information which is considered by the plant to be confidential business information must be so identified on each page submitted to the Ministry.

The Initial Report must be submitted to the Regional Director of the Ministry within 90 days (3 months) following promulgation of the Regulation. This report is intended to provide the Ministry with a clear understanding of plant processes and the procedures each plant will follow in carrying out the requirements of this Regulation. Four copies of the Initial Report, including any attachments, should be provided.

A guidance document will be available from the Ministry prior to promulgation of the Group "A" Regulation to provide assistance in preparing the Initial Report.

Results from all analyses performed by the laboratory must be reported, including all positive numerical values at or above the laboratory calculated method detection limit.

In cases where a laboratory has a method detection limit lower than the maximum allowed by the Regulation, all positive values below the MISA method detection limit must be reported. This will ensure that accurate data is reported.

Flow measurement information must be reported for all effluent streams. The duration and approximate volume of discharge of storm water are to be reported.

The date and duration of each storm event, the amount of rainfall and the approximate duration of each discharge are required. This information is required in order to correlate the analytical data with the event which occurred.

A schedule of all sampling dates and times is required for Ministry inspection purposes. It should be noted that the Ministry will be collecting its own samples at random for audit purposes. Sampling procedures used at any plant will also be inspected during Ministry inspections.

A report detailing any equipment malfunctions or any other problems which interfere with carrying out the requirements of both the General and Group "A" Regulations, and the remedial action taken, must be provided. The reasons for non-compliance with the requirements, as documented in this report, may be taken into consideration by abatement and enforcement staff investigating an act of non-compliance.

It is prudent to have backup systems available for critical elements to minimize the chances of non-compliance.

All other records which are required to be kept by this section are primarily for inspection purposes to ensure compliance with this Regulation. The records should be kept for a period of two years beyond the submission of the last report in compliance with the requirements of the Group "A" Regulation.

Section 14: Timing

The Initial Report is required within three months (90 days) following promulgation of the Regulation.

The sampling, analytical, flow measurement, toxicity testing and reporting requirements come into force five months after promulgation of the Regulation. The five month implementation period is intended to provide sufficient time to allow the plant site to purchase and install equipment, negotiate contracts with laboratories, set up their monitoring programs and train personnel.

With the exception of subsection 13(15), the Group "A" Regulation is revoked one year after the day the Regulation comes into force.

Subsection 13(15) provides for GAP monitoring. Gap monitoring is the monitoring that is required in the period that occurs after the Effluent Monitoring Regulation and before the Limits Regulation.

PART V

A SUMMARY OF SUBSECTOR MONITORING REQUIREMENTS

PART V A SUMMARY OF SUBSECTOR MONITORING REQUIREMENTS

Part V serves to summarize and to compare the effluent monitoring requirements for each subsector on the basis of each type of effluent being monitored. There are six subsectors:

1. Cu, Ni, Pb, Zn
2. Gold
3. Iron
4. Salt (sodium chloride)
5. Silver, and
6. Uranium

and four effluent types:

1. Mine Water Effluent
2. Process Effluent
3. Smelter/Refinery Effluent, and
4. Storm Water Effluent

In the summaries that follow:

3W	means 3 times per week
M	means monthly
Q	means quarterly
Y	means that the parameter is being monitored at that frequency
N	means that the parameter is not being monitored at that frequency

Asterisks or similar devices refer to footnotes found following Analytical Test Group M8

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
2	Total cyanide	Total cyanide	Y*	N	Y	Y	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y
3	Hydrogen ion (pH)	Hydrogen ion (pH)	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
4a	Nitrogen	Ammonia plus Ammonium	Y	N	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y
		Total Kjeldahl nitrogen	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
4b		Nitrate + Nitrite	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
5a	Organic carbon	Dissolved organic carbon (DOC)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
5b		Total organic carbon (TOC)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
6	Total phosphorus	Total phosphorus	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
7	Specific conductance	Specific conductance	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
8	Suspended solids	Total suspended solids (TSS)	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
		Volatile suspended solids (VSS)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
9	Total metals	Aluminum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Beryllium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cadmium	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Chromium	N	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y
		Cobalt	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Copper	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Lead	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Molybdenum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Nickel	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Silver	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
9	Total metals (continued)	Thallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vanadium	N	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y
		Zinc	Y	N	Y	Y'	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
10	Hydrides	Antimony	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Arsenic	Y	N	Y	Y'	N	Y	N	Y	Y	N	N	Y	Y	N	Y	N	Y	Y
		Selenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
11	Chromium (Hexavalent)	Chromium (Hexavalent)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
12	Mercury	Mercury	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
13	Total alkyl lead	Tetra-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Tri-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
14	Phenolics (4AAP)	Phenolics (4AAP)	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
15	Sulphide	Sulphide	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1,2-Trichloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1-Dichloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1-Dichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichloroethane (Ethylene dichloride)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichloropropane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,3-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,4-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bromoform	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bromomethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Carbon tetrachloride	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
16	Volatiles, Halogenated (continued)	Chloroform	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chloromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cis-1,3-Dichloropropylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dibromochloromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ethylene dibromide	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Methylene chloride	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tetrachloroethylene (Perchloroethylene)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trans-1,2-Dichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trans-1,3-Dichloropropylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trichlorofluoromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vinyl chloride (Chloroethylene)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
17	Volatiles, Non-Halogenated	Benzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Styrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Toluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		o-Xylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		m-Xylene and p-Xylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
18	Volatiles, Water Soluble	Acrolein	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Acrylonitrile	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
19	Extractables, Base Neutral	Acenaphthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		5-nitro Acenaphthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Acenaphthylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benz(a)anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(a)pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(b)fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(g,h,i)perylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(k)fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Biphenyl	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
19	Extractables, Base Neutral (continued)	Camphene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1-Chloronaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Chloronaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chrysene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dibenz(a,h)anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Fluorene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indeno(1,2,3-cd)pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indole	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1-Methylnaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Methylnaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Naphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Perylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phenanthrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzyl butyl phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Ethylhexyl) phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Di-n-butyl phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Bromophenyl phenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Chlorophenyl phenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroisopropyl)ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroethyl)ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Diphenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dinitrotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,6-Dinitrotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroethoxy)methane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Diphenylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		N-Nitrosodiphenylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		N-Nitrosodi-n-propylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,4,6-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,5,6-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,4-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,5-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,5-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,6-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dimethyl phenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dinitrophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,6-Dichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4,6-Dinitro-o-cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Chlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Chloro-3-methylphenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Nitrophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		m-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		o-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		p-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pentachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
21	Extractables, Phenoxy Acid Herbicides		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
22	Extractables, Organochlorine Pesticides		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,3,5-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,4,5-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,3-Trichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,4-Trichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,5-Trichlorotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorobutadiene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorocyclopentadiene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorostyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pentachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans **	2,3,7,8-Tetrachlorodibenzo-p-dioxin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorodibenzo-p-dioxin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorodibenzofuran	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total heptachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total heptachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total hexachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total hexachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total pentachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total pentachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total tetrachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total tetrachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
25	Solvent Extractables	Oil and grease	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
26	Fatty and Resin Acids		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
27	Polychlorinated Biphenyls **	PCBs (Total)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
28a	Open Characterization - Volatiles		N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
28b	Open Characterization - Extractables		N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
29	Open Characterization - Elemental	Aluminum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Antimony	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Arsenic	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Barium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Beryllium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bismuth	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Boron	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cadmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Calcium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cerium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cesium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chromium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cobalt	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Copper	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dysprosium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Erbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Europium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gadolinium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Germanium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gold	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hafnium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Holmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Iridium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Iron	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
29	Open Characterization - Elemental (continued)	Lanthanum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lead	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lithium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lutetium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Magnesium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Manganese	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Mercury	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Molybdenum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Neodymium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Nickel	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Niobium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Osmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Palladium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phosphorus	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Platinum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Potassium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Praesodymium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rhenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rhodium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rubidium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ruthenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Samarium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Scandium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Selenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Silicon	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Silver	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Sodium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Strontium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Sulfur	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tantalum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tellurium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Terbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
29	Open Characterization - Elemental (continued)	Thallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Thorium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Thulium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Titanium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tungsten	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Uranium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vanadium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ytterbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Yttrium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Zinc	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Zirconium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M1	Chlorides	Chlorides	N	N	Y	N	N	Y	N	N	Y	Y	N	Y	N	N	Y	N	N	Y
M2	Cyanates	Cyanates	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M3	Dissolved solids	Dissolved solids	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
M4	Sulphates	Sulphates	N	Y	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	Y	Y

SUBSECTOR SUMMARY FOR PROCESS EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
M5	Iron	Iron	N	Y	Y	N	Y	Y	Y	N	Y	N	N	Y	N	Y	Y	N	Y	Y
M6	Thiocyanates	Thiocyanates	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M7	Uranium	Uranium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	Y	Y
M8	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)	N	N	Y	Y	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

* Only when used as a process reagent.

' Only for companies mining or milling more than 1,000 tonnes of ore per day. For all others, these parameters are monthly.

** One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

'' Required only at those plants that use or store PCBs.

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
2	Total cyanide	Total cyanide	Y*	N	Y	Y*	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
3	Hydrogen ion (pH)	Hydrogen ion (pH)	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
4a	Nitrogen	Ammonia plus Ammonium	Y	N	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y
		Total Kjeldahl nitrogen	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
4b		Nitrate + Nitrite	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
5a	Organic carbon	Dissolved organic carbon (DOC)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
5b		Total organic carbon (TOC)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
6	Total phosphorus	Total phosphorus	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
7	Specific conductance	Specific conductance	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
8	Suspended solids	Total suspended solids (TSS)	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
		Volatile suspended solids (VSS)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
9	Total metals	Aluminum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Beryllium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cadmium	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Chromium	N	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y
		Cobalt	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Copper	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Lead	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Molybdenum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Nickel	Y	N	Y	Y*	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
		Silver	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
9	Total metals (continued)	Thallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vanadium	N	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	Y
		Zinc	Y	N	Y	Y'	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
10	Hydrides	Antimony	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Arsenic	Y	N	Y	Y'	N	Y	N	Y	Y	N	N	Y	Y	N	Y	N	Y	Y
		Selenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
11	Chromium (Hexavalent)	Chromium (Hexavalent)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
12	Mercury	Mercury	N	Y	Y	N	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y
13	Total alkyl lead	Tetra-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Tri-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
14	Phenolics (4AAP)	Phenolics (4AAP)	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
15	Sulphide	Sulphide	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1,2-Trichloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1-Dichloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,1-Dichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichloroethane (Ethylene dichloride)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2-Dichloropropane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,3-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,4-Dichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bromoform	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bromomethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Carbon tetrachloride	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
16	Volatiles, Halogenated (continued)	Chloroform	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chloromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cis-1,3-Dichloropropylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dibromochloromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ethylene dibromide	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Methylene chloride	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tetrachloroethylene (Perchloroethylene)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trans-1,2-Dichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trans-1,3-Dichloropropylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trichloroethylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Trichlorofluoromethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vinyl chloride (Chloroethylene)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
17	Volatiles, Non-Halogenated	Benzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Styrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Toluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		o-Xylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		m-Xylene and p-Xylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
18	Volatiles, Water Soluble	Acrolein	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Acrylonitrile	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
19	Extractables, Base Neutral	Acenaphthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		5-nitro Acenaphthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Acenaphthylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benz(a)anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(a)pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(b)fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(g,h,i)perylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzo(k)fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Biphenyl	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
19	Extractables, Base Neutral (continued)	Camphene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1-Chloronaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Chloronaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chrysene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dibenz(a,h)anthracene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Fluoranthene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Fluorene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indeno(1,2,3-cd)pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indole	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1-Methylnaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Methylnaphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Naphthalene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Perylene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phenanthrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Benzyl butyl phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Ethylhexyl) phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Di-n-butyl phthalate	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Bromophenyl phenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Chlorophenyl phenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroisopropyl)ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroethyl)ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Diphenyl ether	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dinitrotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,6-Dinitrotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bis(2-Chloroethoxy)methane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Diphenylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		N-Nitrosodiphenylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		N-Nitrosodi-n-propylamine	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,4,6-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,5,6-Tetrachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,4-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,3,5-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,5-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,6-Trichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dimethyl phenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dinitrophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4-Dichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,6-Dichlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4,6-Dinitro-o-cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2-Chlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Chloro-3-methylphenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		4-Nitrophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		m-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		o-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		p-Cresol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pentachlorophenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phenol	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
21	Extractables, Phenoxy Acid Herbicides		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
22	Extractables, Organochlorine Pesticides		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,3,5-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,4,5-Tetrachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,3-Trichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		1,2,4-Trichlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		2,4,5-Trichlorotoluene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorobutadiene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachlorocyclopentadiene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hexachloroethane	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorostyrene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Pentachlorobenzene	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans '	2,3,7,8-Tetrachlorodibenzo-p-dioxin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorodibenzo-p-dioxin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Octachlorodibenzofuran	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total heptachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total heptachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total hexachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total hexachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total pentachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total pentachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total tetrachlorinated dibenzo-p-dioxins	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Total tetrachlorinated dibenzofurans	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
25	Solvent Extractables	Oil and grease	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
26	Fatty and Resin Acids		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
27	Polychlorinated Biphenyls " "	PCBs (Total)	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
28a	Open Characterization - Volatiles		N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
28b	Open Characterization - Extractables		N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
29	Open Characterization - Elemental	Aluminum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Antimony	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Arsenic	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Barium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Beryllium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Bismuth	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Boron	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cadmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Calcium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cerium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cesium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Chromium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Cobalt	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Copper	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Dysprosium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Erbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Europium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gadolinium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Germanium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Gold	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Hafnium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Holmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Indium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Iridium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Iron	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
29	Open Characterization - Elemental (continued)	Lanthanum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lead	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lithium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Lutetium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Magnesium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Manganese	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Mercury	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Molybdenum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Neodymium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Nickel	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Niobium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Osmium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Palladium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Phosphorus	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Platinum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Potassium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Praesodymium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rhenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rhodium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Rubidium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ruthenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Samarium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Scandium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Selenium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Silicon	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Silver	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Sodium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Strontium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Sulfur	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tantalum	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tellurium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Terbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR MINEWATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
29	Open Characterization - Elemental (continued)	Thallium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Thorium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Thulium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tin	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Titanium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Tungsten	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Uranium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Vanadium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Ytterbium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Yttrium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Zinc	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
		Zirconium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M1	Chlorides	Chlorides	N	N	Y	N	N	Y	N	N	Y	Y	N	Y	N	N	Y	N	N	Y
M2	Cyanates	Cyanates	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M3	Dissolved solids	Dissolved solids	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
M4	Sulphates	Sulphates	N	Y	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N	Y	Y
M5	Iron	Iron	N	Y	Y	N	Y	Y	Y	N	Y	N	N	Y	N	Y	Y	N	Y	Y
M6	Thiocyanates	Thiocyanates	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
M7	Uranium	Uranium	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	Y	Y
M8	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)	N	N	Y	Y*	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y

* Only when the mine is using backfill from a mill that uses the parameter as a reagent.

' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

** Required only at those plants that use or store PCBs.

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	N	Y	Y										N	Y	Y	N	Y	Y
2	Total cyanide	Total cyanide	Y*	N	Y										N	N	Y	N	N	Y
3	Hydrogen ion (pH)	Hydrogen ion (pH)	Y	N	Y										Y	N	Y	Y	N	Y
4a	Nitrogen	Ammonia plus Ammonium	Y	N	Y										Y	N	Y	Y	N	Y
		Total Kjeldahl nitrogen	N	Y	Y										N	Y	Y	N	Y	Y
4b		Nitrate + Nitrite	N	Y	Y										N	Y	Y	N	Y	Y
5a	Organic carbon	Dissolved organic carbon (DOC)	N	N	Y										N	N	Y	N	N	Y
5b		Total organic carbon (TOC)	N	N	Y										N	N	Y	N	N	Y
6	Total phosphorus	Total phosphorus	N	Y	Y										N	Y	Y	N	Y*	Y
7	Specific conductance	Specific conductance	N	N	Y										N	N	Y	N	N	Y
8	Suspended solids	Total suspended solids (TSS)	Y	N	Y										Y	N	Y	Y	N	Y
		Volatile suspended solids (VSS)	N	N	N										N	N	N	N	N	N
9	Total metals	Aluminum	N	N	Y										N	N	Y	N	N	Y
		Beryllium	N	N	Y										N	N	Y	N	N	Y
		Cadmium	N	Y	Y										N	Y	Y	N	N	Y
		Chromium	N	N	Y										N	N	Y	N	N	Y
		Cobalt	N	Y	Y										N	Y	Y	N	N	Y
		Copper	Y	N	Y										Y	N	Y	N	Y	Y
		Lead	Y	N	Y										Y	N	Y	N	Y	Y
		Molybdenum	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
9	Total metals (continued)	Nickel	Y	N	Y										Y	N	Y	N	Y	Y
		Silver	N	N	Y										N	N	Y	N	N	Y
		Thallium	N	N	Y										N	N	Y	N	N	Y
		Vanadium	N	N	Y										N	N	Y	N	N	Y
		Zinc	Y	N	Y										Y	N	Y	N	Y	Y
10	Hydrides	Antimony	N	N	Y										N	N	Y	N	N	Y
		Arsenic	Y	N	Y										Y	N	Y	N	Y	Y
		Selenium	N	N	Y										N	N	Y	N	N	Y
11	Chromium (Hexavalent)	Chromium (Hexavalent)	N	N	Y										N	N	Y	N	N	Y
12	Mercury	Mercury	N	Y	Y										N	Y	Y	N	N	Y
13	Total alkyl lead	Tetra-alkyl lead	N	N	N										N	N	N	N	N	N
		Tri-alkyl lead	N	N	N										N	N	N	N	N	N
14	Phenolics (4AAP)	Phenolics (4AAP)	N	Y	Y										Y	N	Y	N	Y	Y
15	Sulphide	Sulphide	N	N	N										N	N	N	N	N	N
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	N	N	Y										N	N	Y	N	N	Y
		1,1,2-Trichloroethane	N	N	Y										N	N	Y	N	N	Y
		1,1-Dichloroethane	N	N	Y										N	N	Y	N	N	Y
		1,1-Dichloroethylene	N	N	Y										N	N	Y	N	N	Y
		1,2-Dichlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,2-Dichloroethane (Ethylene dichloride)	N	N	Y										N	N	Y	N	N	Y
		1,2-Dichloropropane	N	N	Y										N	N	Y	N	N	Y
		1,3-Dichlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,4-Dichlorobenzene	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
16	Volatiles, Halogenated (continued)	Bromoform	N	N	Y										N	N	Y	N	N	Y
		Bromomethane	N	N	Y										N	N	Y	N	N	Y
		Carbon tetrachloride	N	N	Y										N	N	Y	N	N	Y
		Chlorobenzene	N	N	Y										N	N	Y	N	N	Y
		Chloroform	N	N	Y										N	N	Y	N	N	Y
		Chloromethane	N	N	Y										N	N	Y	N	N	Y
		Cis-1,3-Dichloropropylene	N	N	Y										N	N	Y	N	N	Y
		Dibromochloromethane	N	N	Y										N	N	Y	N	N	Y
		Ethylene dibromide	N	N	Y										N	N	Y	N	N	Y
		Methylene chloride	N	N	Y										N	N	Y	N	N	Y
		Tetrachloroethylene (Perchloroethylene)	N	N	Y										N	N	Y	N	N	Y
		Trans-1,2-Dichloroethylene	N	N	Y										N	N	Y	N	N	Y
		Trans-1,3-Dichloropropylene	N	N	Y										N	N	Y	N	N	Y
		Trichloroethylene	N	N	Y										N	N	Y	N	N	Y
		Trichlorofluoromethane	N	N	Y										N	N	Y	N	N	Y
		Vinyl chloride (Chloroethylene)	N	N	Y										N	N	Y	N	N	Y
17	Volatiles, Non-Halogenated	Benzene	N	N	Y										N	N	Y	N	N	Y
		Styrene	N	N	Y										N	N	Y	N	N	Y
		Toluene	N	N	Y										N	N	Y	N	N	Y
		o-Xylene	N	N	Y										N	N	Y	N	N	Y
		m-Xylene and p-Xylene	N	N	Y										N	N	Y	N	N	Y
18	Volatiles, Water Soluble	Acrolein	N	N	Y										N	N	Y	N	N	Y
		Acrylonitrile	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
19	Extractables, Base Neutral	Acenaphthene	N	N	Y										N	N	Y	N	N	Y
		5-nitro Acenaphthene	N	N	Y										N	N	Y	N	N	Y
		Acenaphthylene	N	N	Y										N	N	Y	N	N	Y
		Anthracene	N	N	Y										N	N	Y	N	N	Y
		Benz(a)anthracene	N	N	Y										N	N	Y	N	N	Y
		Benzo(a)pyrene	N	N	Y										N	N	Y	N	N	Y
		Benzo(b)fluoranthene	N	N	Y										N	N	Y	N	N	Y
		Benzo(g,h,i)perylene	N	N	Y										N	N	Y	N	N	Y
		Benzo(k)fluoranthene	N	N	Y										N	N	Y	N	N	Y
		Biphenyl	N	N	Y										N	N	Y	N	N	Y
		Camphene	N	N	Y										N	N	Y	N	N	Y
		1-Chloronaphthalene	N	N	Y										N	N	Y	N	N	Y
		2-Chloronaphthalene	N	N	Y										N	N	Y	N	N	Y
		Chrysene	N	N	Y										N	N	Y	N	N	Y
		Dibenz(a,h)anthracene	N	N	Y										N	N	Y	N	N	Y
		Fluoranthene	N	N	Y										N	N	Y	N	N	Y
		Fluorene	N	N	Y										N	N	Y	N	N	Y
		Indeno(1,2,3-cd)pyrene	N	N	Y										N	N	Y	N	N	Y
		Indole	N	N	Y										N	N	Y	N	N	Y
		1-Methylnaphthalene	N	N	Y										N	N	Y	N	N	Y
		2-Methylnaphthalene	N	N	Y										N	N	Y	N	N	Y
		Naphthalene	N	N	Y										N	N	Y	N	N	Y
		Perylene	N	N	Y										N	N	Y	N	N	Y
		Phenanthrene	N	N	Y										N	N	Y	N	N	Y
		Pyrene	N	N	Y										N	N	Y	N	N	Y
		Benzyl butyl phthalate	N	N	Y										N	N	Y	N	N	Y
		Bis(2-Ethylhexyl) phthalate	N	N	Y										N	N	Y	N	N	Y
		Di-n-butyl phthalate	N	N	Y										N	N	Y	N	N	Y
		4-Bromophenyl phenyl ether	N	N	Y										N	N	Y	N	N	Y
		4-Chlorophenyl phenyl ether	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
19	Extractables, Base Neutral (continued)	Bis(2-Chloroisopropyl)ether	N	N	Y										N	N	Y	N	N	Y
		Bis(2-Chloroethyl)ether	N	N	Y										N	N	Y	N	N	Y
		Diphenyl ether	N	N	Y										N	N	Y	N	N	Y
		2,4-Dinitrotoluene	N	N	Y										N	N	Y	N	N	Y
		2,6-Dinitrotoluene	N	N	Y										N	N	Y	N	N	Y
		Bis(2-Chloroethoxy)methane	N	N	Y										N	N	Y	N	N	Y
		Diphenylamine	N	N	Y										N	N	Y	N	N	Y
		N-Nitrosodiphenylamine	N	N	Y										N	N	Y	N	N	Y
		N-Nitrosodi-n-propylamine	N	N	Y										N	N	Y	N	N	Y
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,3,4,6-Tetrachlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,3,5,6-Tetrachlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,3,4-Trichlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,3,5-Trichlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,4,5-Trichlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,4,6-Trichlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,4-Dimethyl phenol	N	N	Y										N	N	Y	N	N	Y
		2,4-Dinitrophenol	N	N	Y										N	N	Y	N	N	Y
		2,4-Dichlorophenol	N	N	Y										N	N	Y	N	N	Y
		2,6-Dichlorophenol	N	N	Y										N	N	Y	N	N	Y
		4,6-Dinitro-o-cresol	N	N	Y										N	N	Y	N	N	Y
		2-Chlorophenol	N	N	Y										N	N	Y	N	N	Y
		4-Chloro-3-methylphenol	N	N	Y										N	N	Y	N	N	Y
		4-Nitrophenol	N	N	Y										N	N	Y	N	N	Y
		m-Cresol	N	N	Y										N	N	Y	N	N	Y
		o-Cresol	N	N	Y										N	N	Y	N	N	Y
		p-Cresol	N	N	Y										N	N	Y	N	N	Y
		Pentachlorophenol	N	N	Y										N	N	Y	N	N	Y
		Phenol	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

						Not Applicable			Not Applicable			Not Applicable								
		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
21	Extractables, Phenoxy Acid Herbicides		N	N	N										N	N	N	N	N	N
22	Extractables, Organochlorine Pesticides		N	N	N										N	N	N	N	N	N
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,2,3,5-Tetrachlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,2,4,5-Tetrachlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,2,3-Trichlorobenzene	N	N	Y										N	N	Y	N	N	Y
		1,2,4-Trichlorobenzene	N	N	Y										N	N	Y	N	N	Y
		2,4,5-Trichlorotoluene	N	N	Y										N	N	Y	N	N	Y
		Hexachlorobenzene	N	N	Y										N	N	Y	N	N	Y
		Hexachlorobutadiene	N	N	Y										N	N	Y	N	N	Y
		Hexachlorocyclopentadiene	N	N	Y										N	N	Y	N	N	Y
		Hexachloroethane	N	N	Y										N	N	Y	N	N	Y
		Octachlorostyrene	N	N	Y										N	N	Y	N	N	Y
		Pentachlorobenzene	N	N	Y										N	N	Y	N	N	Y
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans '	2,3,7,8-Tetrachlorodibenzo-p-dioxin	N	N	Y										N	N	Y	N	N	Y
		Octachlorodibenzo-p-dioxin	N	N	Y										N	N	Y	N	N	Y
		Octachlorodibenzofuran	N	N	Y										N	N	Y	N	N	Y
		Total heptachlorinated dibenzo-p-dioxins	N	N	Y										N	N	Y	N	N	Y
		Total heptachlorinated dibenzofurans	N	N	Y										N	N	Y	N	N	Y
		Total hexachlorinated dibenzo-p-dioxins	N	N	Y										N	N	Y	N	N	Y
		Total hexachlorinated dibenzofurans	N	N	Y										N	N	Y	N	N	Y
		Total pentachlorinated dibenzo-p-dioxins	N	N	Y										N	N	Y	N	N	Y
		Total pentachlorinated dibenzofurans	N	N	Y										N	N	Y	N	N	Y
		Total tetrachlorinated dibenzo-p-dioxins	N	N	Y										N	N	Y	N	N	Y
		Total tetrachlorinated dibenzofurans	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

						Not Applicable			Not Applicable			Not Applicable									
		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																			
25	Solvent Extractables	Oil and grease	Y	N	Y										Y	N	Y	Y	N	Y
26	Fatty and Resin Acids		N	N	N										N	N	N	N	N	N
27	Polychlorinated Biphenyls **	PCBs (Total)	N	N	Y										N	N	Y	N	N	Y
28a	Open Characterization - Volatiles		N	N	Y										N	N	Y	N	N	Y
28b	Open Characterization - Extractables		N	N	Y										N	N	Y	N	N	Y
29	Open Characterization - Elemental	Aluminum	N	N	Y										N	N	Y	N	N	Y
		Antimony	N	N	Y										N	N	Y	N	N	Y
		Arsenic	N	N	Y										N	N	Y	N	N	Y
		Barium	N	N	Y										N	N	Y	N	N	Y
		Beryllium	N	N	Y										N	N	Y	N	N	Y
		Bismuth	N	N	Y										N	N	Y	N	N	Y
		Boron	N	N	Y										N	N	Y	N	N	Y
		Cadmium	N	N	Y										N	N	Y	N	N	Y
		Calcium	N	N	Y										N	N	Y	N	N	Y
		Cerium	N	N	Y										N	N	Y	N	N	Y
		Cesium	N	N	Y										N	N	Y	N	N	Y
		Chromium	N	N	Y										N	N	Y	N	N	Y
		Cobalt	N	N	Y										N	N	Y	N	N	Y
		Copper	N	N	Y										N	N	Y	N	N	Y
		Dysprosium	N	N	Y										N	N	Y	N	N	Y
		Erbium	N	N	Y										N	N	Y	N	N	Y
		Europium	N	N	Y										N	N	Y	N	N	Y
		Gadolinium	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

								Not Applicable			Not Applicable			Not Applicable								
		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		**PARAMETERS TO BE ANALYZED**																		
29	Open Characterization - Elemental (continued)	Gallium	N	N	Y										N	N	Y	N	N	Y
		Germanium	N	N	Y										N	N	Y	N	N	Y
		Gold	N	N	Y										N	N	Y	N	N	Y
		Hafnium	N	N	Y										N	N	Y	N	N	Y
		Holmium	N	N	Y										N	N	Y	N	N	Y
		Indium	N	N	Y										N	N	Y	N	N	Y
		Iridium	N	N	Y										N	N	Y	N	N	Y
		Iron	N	N	Y										N	N	Y	N	N	Y
		Lanthanum	N	N	Y										N	N	Y	N	N	Y
		Lead	N	N	Y										N	N	Y	N	N	Y
		Lithium	N	N	Y										N	N	Y	N	N	Y
		Lutetium	N	N	Y										N	N	Y	N	N	Y
		Magnesium	N	N	Y										N	N	Y	N	N	Y
		Manganese	N	N	Y										N	N	Y	N	N	Y
		Mercury	N	N	Y										N	N	Y	N	N	Y
		Molybdenum	N	N	Y										N	N	Y	N	N	Y
		Neodymium	N	N	Y										N	N	Y	N	N	Y
		Nickel	N	N	Y										N	N	Y	N	N	Y
		Niobium	N	N	Y										N	N	Y	N	N	Y
		Osmium	N	N	Y										N	N	Y	N	N	Y
		Palladium	N	N	Y										N	N	Y	N	N	Y
		Phosphorus	N	N	Y										N	N	Y	N	N	Y
		Platinum	N	N	Y										N	N	Y	N	N	Y
		Potassium	N	N	Y										N	N	Y	N	N	Y
		Praesodymium	N	N	Y										N	N	Y	N	N	Y
		Rhenium	N	N	Y										N	N	Y	N	N	Y
		Rhodium	N	N	Y										N	N	Y	N	N	Y
		Rubidium	N	N	Y										N	N	Y	N	N	Y
		Ruthenium	N	N	Y										N	N	Y	N	N	Y
		Samarium	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

							Not Applicable			Not Applicable			Not Applicable								
		SUBSECTOR:	Cu, Ni, Pb, Zn			Gold			Iron			Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
29	Open Characterization - Elemental (continued)	Scandium	N	N	Y										N	N	Y	N	N	Y
		Selenium	N	N	Y										N	N	Y	N	N	Y
		Silicon	N	N	Y										N	N	Y	N	N	Y
		Silver	N	N	Y										N	N	Y	N	N	Y
		Sodium	N	N	Y										N	N	Y	N	N	Y
		Strontium	N	N	Y										N	N	Y	N	N	Y
		Sulfur	N	N	Y										N	N	Y	N	N	Y
		Tantalum	N	N	Y										N	N	Y	N	N	Y
		Tellurium	N	N	Y										N	N	Y	N	N	Y
		Terbium	N	N	Y										N	N	Y	N	N	Y
		Thallium	N	N	Y										N	N	Y	N	N	Y
		Thorium	N	N	Y										N	N	Y	N	N	Y
		Thulium	N	N	Y										N	N	Y	N	N	Y
		Tin	N	N	Y										N	N	Y	N	N	Y
		Titanium	N	N	Y										N	N	Y	N	N	Y
		Tungsten	N	N	Y										N	N	Y	N	N	Y
		Uranium	N	N	Y										N	N	Y	N	N	Y
		Vanadium	N	N	Y										N	N	Y	N	N	Y
		Ytterbium	N	N	Y										N	N	Y	N	N	Y
		Yttrium	N	N	Y										N	N	Y	N	N	Y
		Zinc	N	N	Y										N	N	Y	N	N	Y
		Zirconium	N	N	Y										N	N	Y	N	N	Y

SUBSECTOR SUMMARY FOR SMELTER/REFINERY EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn			Not Applicable Gold			Not Applicable Iron			Not Applicable Salt			Silver			Uranium		
		FREQUENCY OF SAMPLING:	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q	3W	M	Q
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED																		
M1	Chlorides	Chlorides	N	N	Y										N	N	Y	N	N	Y
M2	Cyanates	Cyanates	N	N	Y										N	N	Y	N	N	Y
M3	Dissolved solids	Dissolved solids	N	Y	Y										N	Y	Y	N	Y	Y
M4	Sulphates	Sulphates	N	Y	Y										N	N	Y	N	Y	Y
M5	Iron	Iron	N	Y	Y										N	Y	Y	N	Y	Y
M6	Thiocyanates	Thiocyanates	N	N	Y										N	N	Y	N	N	Y
M7	Uranium	Uranium	N	N	Y										N	N	Y	N	Y	Y
M8	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)	N	N	Y										N	N	Y	N	N	Y

* Port Hope Refinery only.

' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

** Required only at those plants that use or store PCBs.

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Total cyanide	Total cyanide	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
3	Hydrogen ion (pH)	Hydrogen ion (pH)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4a	Nitrogen	Ammonia plus Ammonium	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Total Kjeldahl nitrogen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b		Nitrate + Nitrite	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5a	Organic carbon	Dissolved organic carbon (DOC)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
5b		Total organic carbon (TOC)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
6	Total phosphorus	Total phosphorus	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Specific conductance	Specific conductance	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
8	Suspended solids	Total suspended solids (TSS)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Volatile suspended solids (VSS)	N	N	N	N	N	N	N	N	N	N	N	N
9	Total metals	Aluminum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Beryllium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cadmium	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y
		Chromium	N	Y	N	Y	Y	Y	N	Y	N	Y	N	Y
		Cobalt	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
		Copper	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
		Lead	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
		Molybdenum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Nickel	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
9	Total metals (continued)	Silver	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Thallium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Vanadium	N	Y	N	Y	Y	Y	N	Y	N	Y	N	Y
		Zinc	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
10	Hydrides	Antimony	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Arsenic	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
		Selenium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
11	Chromium (Hexavalent)	Chromium (Hexavalent)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
12	Mercury	Mercury	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
13	Total alkyl lead	Tetra-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N
		Tri-alkyl lead	N	N	N	N	N	N	N	N	N	N	N	N
14	Phenolics (4AAP)	Phenolics (4AAP)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
15	Sulphide	Sulphide	N	N	N	N	N	N	N	N	N	N	N	N
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,1,2-Trichloroethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,1-Dichloroethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,1-Dichloroethylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2-Dichlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2-Dichloroethane (Ethylene dichloride)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2-Dichloropropane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,3-Dichlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,4-Dichlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bromoform	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bromomethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
16	Volatiles, Halogenated (continued)	Carbon tetrachloride	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Chlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Chloroform	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Chloromethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cis-1,3-Dichloropropylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Dibromochloromethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Ethylene dibromide	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Methylene chloride	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Tetrachloroethylene (Perchloroethylene)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Trans-1,2-Dichloroethylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Trans-1,3-Dichloropropylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Trichloroethylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Trichlorofluoromethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Vinyl chloride (Chloroethylene)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
17	Volatiles, Non-Halogenated	Benzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Styrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Toluene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		o-Xylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		m-Xylene and p-Xylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
18	Volatiles, Water Soluble	Acrolein	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Acrylonitrile	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
19	Extractables, Base Neutral	Acenaphthene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		5-nitro Acenaphthene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Acenaphthylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Anthracene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Benz(a)anthracene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Benzo(a)pyrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Benzo(b)fluoranthene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Benzo(k)fluoranthene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Biphenyl	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Camphene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1-Chloronaphthalene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2-Chloronaphthalene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Chrysene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Dibenz(a,h)anthracene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Fluoranthene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Fluorene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Indeno(1,2,3-cd)pyrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Indole	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1-Methylnaphthalene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2-Methylnaphthalene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Naphthalene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Perylene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Phenanthrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Pyrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Benzyl butyl phthalate	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bis(2-Ethylhexyl) phthalate	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Di-n-butyl phthalate	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		4-Bromophenyl phenyl ether	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		4-Chlorophenyl phenyl ether	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bis(2-Chloroisopropyl)ether	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bis(2-Chloroethyl)ether	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Diphenyl ether	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,6-Dinitrotoluene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bis(2-Chloroethoxy)methane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Diphenylamine	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		N-Nitrosodiphenylamine	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		N-Nitrosodi-n-propylamine	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,3,4,6-Tetrachlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,3,5,6-Tetrachlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,3,4-Trichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,3,5-Trichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4,5-Trichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4,6-Trichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4-Dimethyl phenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4-Dinitrophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4-Dichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,6-Dichlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		4,6-Dinitro-o-cresol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2-Chlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		4-Chloro-3-methylphenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		4-Nitrophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		m-Cresol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		o-Cresol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		p-Cresol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Pentachlorophenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Phenol	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED												
21	Extractables, Phenoxy Acid Herbicides		N	N	N	N	N	N	N	N	N	N	N	N
22	Extractables, Organochlorine Pesticides		N	N	N	N	N	N	N	N	N	N	N	N
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2,3,5-Tetrachlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2,4,5-Tetrachlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2,3-Trichlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		1,2,4-Trichlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		2,4,5-Trichlorotoluene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Hexachlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Hexachlorobutadiene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Hexachlorocyclopentadiene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Hexachloroethane	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Octachlorostyrene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Pentachlorobenzene	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans '	2,3,7,8-Tetrachlorodibenzo-p-dioxin	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Octachlorodibenzo-p-dioxin	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Octachlorodibenzofuran	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total heptachlorinated dibenzo-p-dioxins	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total heptachlorinated dibenzofurans	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total hexachlorinated dibenzo-p-dioxins	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total hexachlorinated dibenzofurans	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total pentachlorinated dibenzo-p-dioxins	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total pentachlorinated dibenzofurans	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total tetrachlorinated dibenzo-p-dioxins	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Total tetrachlorinated dibenzofurans	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
25	Solvent Extractables	Oil and grease	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
26	Fatty and Resin Acids		N	N	N	N	N	N	N	N	N	N	N	N
27	Polychlorinated Biphenyls **	PCBs (Total)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
28a	Open Characterization - Volatiles		N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
28b	Open Characterization - Extractables		N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
29	Open Characterization - Elemental	Aluminum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Antimony	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Arsenic	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Barium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Beryllium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Bismuth	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Boron	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cadmium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Calcium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cerium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cesium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Chromium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Cobalt	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Copper	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Dysprosium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Erbium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Europium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Gadolinium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Gallium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
29	Open Characterization - Elemental (continued)	Germanium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Gold	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Hafnium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Holmium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Indium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Iridium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Iron	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Lanthanum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Lead	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Lithium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Lutetium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Magnesium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Manganese	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Mercury	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Molybdenum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Neodymium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Nickel	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Niobium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Osmium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Palladium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Phosphorus	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Platinum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Potassium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Praesodymium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Rhenium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Rhodium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Rubidium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Ruthenium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Samarium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Scandium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Selenium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
29	Open Characterization - Elemental (continued)	Silicon	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Silver	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Sodium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Strontium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Sulfur	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Tantalum	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Tellurium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Terbium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Thallium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Thorium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Thulium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Tin	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Titanium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Tungsten	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Uranium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Vanadium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Ytterbium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Yttrium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Zinc	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
		Zirconium	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

SUBSECTOR SUMMARY FOR STORM WATER EFFLUENTS

		SUBSECTOR:	Cu, Ni, Pb, Zn		Gold		Iron		Salt		Silver		Uranium	
		FREQUENCY OF SAMPLING:	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*	at time of discharge	Q*
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED												
M1	Chlorides	Chlorides	N	Y	N	Y	N	Y	Y	Y	N	Y	N	Y
M2	Cyanates	Cyanates	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
M3	Dissolved solids	Dissolved solids	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M4	Sulphates	Sulphates	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
M5	Iron	Iron	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
M6	Thiocyanates	Thiocyanates	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
M7	Uranium	Uranium	N	Y	N	Y	N	Y	N	Y	N	Y	Y	Y
M8	Weak acid dissociable cyanides	Weak acid dissociable cyanides (Free cyanide)	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

* Only when an effluent exists.

' One analysis only for Group 24 required during the life of this Regulation. Plants that have already carried out a Group 24 analysis under pre-regulation monitoring do not need to repeat this analysis.

** Required only at those plants that use or store PCBs.

PART VI

A SUMMARY OF THE RESULTS OF THE ONTARIO MINERAL INDUSTRY:

GROUP "A" MISA PRE-REGULATION MONITORING PROGRAM

PART VI - A SUMMARY OF THE RESULTS OF THE ONTARIO MINERAL INDUSTRY: GROUP"A" MISA PRE-REGULATION MONITORING PROGRAM

In 1987, ZENON Environmental Inc. undertook a project on behalf of the Ontario Mining Association (OMA) to characterize effluent streams from ten mining and milling operations in Ontario as requested by the Ministry of the Environment (MOE) under the MISA pre-regulation monitoring program. The first round of sampling, or Phase I, was undertaken in July, 1987, by ZENON personnel with Phase II samples taken by the individual mines and mills in September, 1987. The sampling and analytical procedures were approved by MOE prior to commencing the work.

The scope of analytical work carried out in two sampling campaigns included a list of conventional pollutants, the MOE EMPPL as published at the time of collection, an open organic scan and an elemental scan.

Operations were chosen from each sub-sector of Group "A" which could be shown to represent the processing aspects of the sub-sector. In each phase of the program a total of ten "characterization scans" were carried out: the five base metal producers, two mines from the fifteen gold producers, one mine from the four uranium producers, one from the three iron producers, and one salt producer.

The following mining operations were sampled at the noted locations. The sampling sites selected, unless otherwise noted, are currently the IMIS sampling sites.

Base Metal Sulphides

i) Kidd Creek metallurgical complex, representing copper, zinc, lead and silver producers, was sampled at the final discharge to the Porcupine River.

ii) Inco central tailings complex, representing copper, nickel producers, was sampled at the final discharge to Copper Cliff Creek. This discharge continues down Copper Cliff Creek into Kelley Lake.

iii) Mattabi Mines, representing copper, zinc, lead concentrate producers, was sampled at the outfall of the reclaim pond, going to the Bell River.

iv) Geco (Noranda) Mines, representing copper, zinc, lead concentrate producers was sampled at the outfall of the wastewater treatment plant going to Mose Lake.

v) Falconbridge Nickel Mines representing the copper, nickel producers, was sampled at the Falconbridge Mine site at the outfall from the control gate into Coniston Creek.

Iron Ore Operations

i) Sherman Mines, was sampled at the discharge weir outfall to the Tetapaga River and Lake Temagami.

Uranium

i) Denison Mines, was sampled at the Stollery Lake weir, designated sampling spot D-2. The overflow from this weir goes into the rest of Stollery Lake and thence to the Serpent River.

Gold

i) Hemlo Gold Mines Inc. representing carbon-in-pulp gold technology. The final effluent was sampled where the treated effluent enters the White River watershed.

ii) Pamour/Schumacher representing Merrill-Crowe treatment technology combined with flotation, was sampled at N.E. outlet from tailings areas at T-3 - No. 3 decant pier discharging to the Porcupine River.

SAMPLING LOCATIONS: EFFLUENT TYPE (see Table 1)

At all sites sampled, with the exception of Mine #4, single grab samples were collected. At Mine #4, six sub-samples were taken every two hours providing a 12 hour composite sample; two such samples were collected.

The sampling procedure was divided into two sections, those being: training and sampling. The first section consisted of a training lecture with the representatives of each mine/milling operation. The second part of the sampling procedure was a hands-on demonstration as the samples were collected, labelled, preserved and packed. Each mine was provided with a written sampling manual and data sheets for future sampling programs.

Note: At Joint Technical Committee (JTC) meetings, Eldorado Resources Limited was not represented by the Ontario Mining Association. Eldorado Resources Limited acted as an independent member of the JTC and carried out pre-characterization (two runs) of effluents at its Blind River and Port Hope plants (four effluents appear in Schedule B of the Sector Effluent Monitoring Regulation: all effluents are categorized as Smelter/Refinery Effluents.) The general timing, methodology and laboratory used for this work were identical with the OMA pre-characterization work.

SUMMARY

Pre-characterization Data - Conventional Parameters

On a subsector basis, all conventional parameters that were expected to be present were detected, on a site specific basis, at the effluent sampling points and at the concentrations that were expected. These parameters, on a site specific basis, included one or more of the following:

- pH
- suspended solids
- solvent extractables
- phenols
- ammonia
- copper
- nickel
- lead
- zinc

TABLE 2 - SAMPLING LOCATIONS: EFFLUENT TYPE

MINE #	MINE	SAMPLE POINT	EFFLUENT TYPE
Base Metal Mines (Cu, Ni, Pb, Zn)			
1	Falconbridge	Treated tailings NIR road effluent	Process
2	Noranda GECO	Overflow from reacter clarifier	Process
3	Mattabi	Treated effluent pond overflow	Process
		Lyon Lake mine effluent	Mine Water
4	Kidd Creek	Overflow from pond D weir	Process
		Mine effluent	Mine Water
5	Inco	Copper Cliff Treatment plant effluent	Process
		Nolan Creek effluent plant overflow	Storm Water
		Levack Mine effluent	Mine Water
Gold Mines			
6	Noranda Hemlo	Treatment plant effluent	Process
7	Pamour Schumacher	Final effluent at T3 discharge weir	Process
Uranium Mine			
8	Denison	D2 at weir	Process
Iron Ore Mine			
9	Sherman	Weir overflow to Tetapaga River	Process
		Duplicate	
Salt Mine			
10	Canadian Salt	Waste stream composite	Process

- cyanide
- chlorides
- arsenic

Small amounts (generally much less than 1 milligram per litre) of parameters not listed above were found, as expected, on a site specific basis and were generally related to ore chemistry. Examples of these parameters include mercury, selenium and molybdenum.

Boron at levels in excess of 100 milligrams per litre was detected at one plant. The source of the boron has not been definitively traced but is thought to be due to the use of borax (sodium tetraborate) or a substance that contains borax at the plant.

Pre-characterization Data - Organics

Group "A" plants do not manufacture organic compounds. A few of the plants use organic compounds during the processing of ore or concentrate. In most cases, the organics are used only in "starvation" quantities. That is, only a few grams of the organic compounds are used in the processing of each tonne of ore.

Very few organic compounds were detected even though the detection limit was set at 1 part per billion. Compounds detected included the following:

- dibromochloromethane
- chloroform
- trichloroethylene
- trichlorofluoromethane
- methylene chloride
- benzene
- ethylbenzene
- toluene
- aniline
- o-xylene
- m- p-xylene
- 1-methylnapthalene
- 2-methylnapthalene
- napthalene
- phenanthrene
- o-cresol
- p-cresol

Of the above list, only the following appeared in concentrations at or above 10 parts per billion:

- methylene chloride (two plants: 10 and 16 ppb)
- aniline (one plant: 230 ppb)
- o-xylene (one plant: 12 ppb)
- 2-methylnapthalene (one plant: 15 ppb)
- napthalene (one plant: 11 ppb)
- o-cresol (one plant: 15 ppb)
- p-cresol (one plant: 40 ppb)

The aniline noted above could not be traced to the plant itself. The source of the aniline is possibly municipal sewage treatment sludge that is being discharged to a tailings area by a Regional Municipality.

Terpenes, detected at one plant, were known to have, as their source, the reagent called "pine oil". This reagent is being replaced by methyl amyl alcohol at the plant.

A trace level of OCDD below the Ministry required detection limit of 0.3 nanograms per litre was observed at one plant during the first run. No positives were observed during the second run. One smelter/refinery effluent contained a trace of OCDD at 0.044 nanograms per litre (44 parts per quadrillion).

PCBs were not detected in any samples.

It should be noted that the pre-characterization program that was carried out included all major users of organic compounds in Group "A".

PART VII

MISA ADVISORY COMMITTEE REPORT REGARDING THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY SECTOR: GROUP "A"

Ontario

Ministry of the Environment
Ministère de l'Environnement

135 St. Clair Avenue West
Suite 100
Toronto, Ontario
M4V 1P5

135, avenue St. Clair ouest
Bureau 100
Toronto (Ontario)
M4V 1P5

December 20, 1988

The Honourable Jim Bradley
Minister of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Dear Mr. Minister:

The MISA Advisory Committee is pleased to submit the attached Report Regarding the Draft Effluent Monitoring Regulations for the Ontario Mineral Industry "Group A". It is provided in response to your letter of November 18, 1988.

The report has the unanimous support of all MISA Advisory Committee members, including the representative of the Ontario Mineral Industry, Mr. Brian Bell.

The Ministry and Industry are to be commended for working diligently in developing a comprehensive regulation package. The Committee would be pleased to discuss the report with you and your staff at any time.

Respectfully submitted,

for.

Jim MacLaren, Chairman
for the MISA Advisory Committee

ONTARIO MINISTRY OF THE ENVIRONMENT
MUNICIPAL/INDUSTRIAL STRATEGY FOR ABATEMENT

MISA ADVISORY COMMITTEE

REPORT regarding the EFFLUENT MONITORING REGULATIONS FOR THE ONTARIO MINERAL INDUSTRY "GROUP A"

December 1988

Jim MacLaren
Chairman

Toby Vigod
Vice-Chairman

PART VIII

MINISTRY OF THE ENVIRONMENT'S RESPONSE TO THE MISA ADVISORY COMMITTEE REPORT

Ontario

Office of the Minister

Ministry of the Environment

135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
416/323-4359

Mr. J. MacLaren
Chairman
MISA Advisory Committee
Suite 502
112 St. Clair Avenue West
Toronto, Ontario
M4V 1N3

Dear Mr. MacLaren:

I would like to thank you and the members of the MISA Advisory Committee (MAC) for your review of the Draft Effluent Monitoring Regulation for the Ontario Mineral Industry: Group "A" Sector.

I am attaching the Ministry's response to the specific recommendation made by MAC on the Ontario Mineral Industry: Group "A" monitoring regulation.

I hope that the statements made will assist members of the public in reviewing the regulation and providing comments to make it the best regulation possible.

Yours sincerely,

Jim Bradley

Jim Bradley
Minister

Enclosure

RESPONSE TO THE MISA ADVISORY COMMITTEE RECOMMENDATION ON THE ONTARIO MINERAL INDUSTRY: GROUP "A" DRAFT REGULATION

Throughout the regulation development process, the MISA Advisory Committee (MAC) has reviewed selected drafts of the regulation and provided comments to the Joint Industry/Government Technical Committee for the Ontario Mineral Industry: Group "A" Sector (JTC). Many of these comments have been accepted and incorporated into successive versions of the Draft Regulation package. The MAC, after reviewing the penultimate draft, has submitted its final report which is available for public review.

The major recommendation from MAC and the corresponding MOE response is provided as follows:

MAC Recommendation

The MISA Advisory Committee recommends that the effluent monitoring regulation include a requirement for the continuing monitoring of a select list of parameters to cover the period which may elapse between effluent monitoring requirements and effluent limits enforcement.

MOE Response

The draft regulation has been modified to include a requirement for the continuing monitoring of a select list of parameters to cover the period which may elapse between effluent monitoring requirements and effluent limits enforcement.

MISA ADVISORY COMMITTEE (MAC) December 1988
REPORT REGARDING
THE DRAFT EFFLUENT MONITORING REGULATIONS for the
ONTARIO MINERAL INDUSTRY "GROUP A"

---

1. INTRODUCTION

The Development Document for the Draft Effluent Monitoring Regulation for the Ontario Mineral Industry: Group "A", was provided to the MISA Advisory Committee on November 4, 1988 (Committee Meeting 39) and tabled on that date in advance of Meeting 40 on November 10, 1988. At Meeting 40, Ministry staff, namely Nars Borodczak, MISA Assistant Director, and John Hawley, Senior Sector Specialist, explained the document and answered questions. Mr. Brian Bell, the Mining Sector Representative to the Committee, attended the meeting and provided the industrial perspective to the development of the regulation.

The MISA Advisory Committee had been briefed on the nature of the Mineral Industry and the regulation-development process at previous meetings:

- June 12, 1987 - MAC Meeting 11
  - "Sector overview" briefing provided by OMA
- September 30 to October 2,1987
  - MAC site tour hosted by OMA and participating companies at mines in Sudbury and Timmins; 'interim report for MISA pre-regulation monitoring program' provided to MAC members by sector representatives.
- May 27, 1988 - MAC Meeting 32
  - presentation of conceptual "Principles document" (May 9) to form the basis of the sector monitoring regulation.

As well, Harvey Clare participated as the MISA Advisory Committee observer on the Sector Joint Technical Committee.

At the November 10 meeting, committee members expressed the concern that one omission in the development document was a suitably detailed description of the pre-regulation monitoring program and an explanation of the use of the results to form the regulatory requirements. At its meeting on November 25, additional tables and explanation were provided to address this concern.

2. ADVICE TO THE MINISTER

The MISA Advisory Committee has reviewed the Development Document and generally supports the regulation. The Joint Technical Committee should be commended for preparing a comprehensive development document.

The MISA Advisory Committee recommends this regulation package be released for public review.

3. REGULATION-SPECIFIC RECOMMENDATIONS

The MISA Advisory Committee recommends that the effluent monitoring regulation include a requirement for the continuing monitoring of a select list of parameters to cover the period which may elapse between effluent monitoring requirements and effluent limits enforcement.

MISA Advisory Committee Report regarding the Draft Effluent Monitoring Regulations for the Ontario Mineral Industry: Group "A"

Submitted, December 6, 1988

MISA ADVISORY COMMITTEE

Jim MacLaren, Chairman

Toby Vigod, Vice-Chairman

Harvey Clare, Member

Isobel Heathcote, Member

Paul Hebert, Member

Don Mackay, Member

Kai Millyard, Member

Brian Bell, Member, representing
the Ontario Mineral Industry Group "A"